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ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

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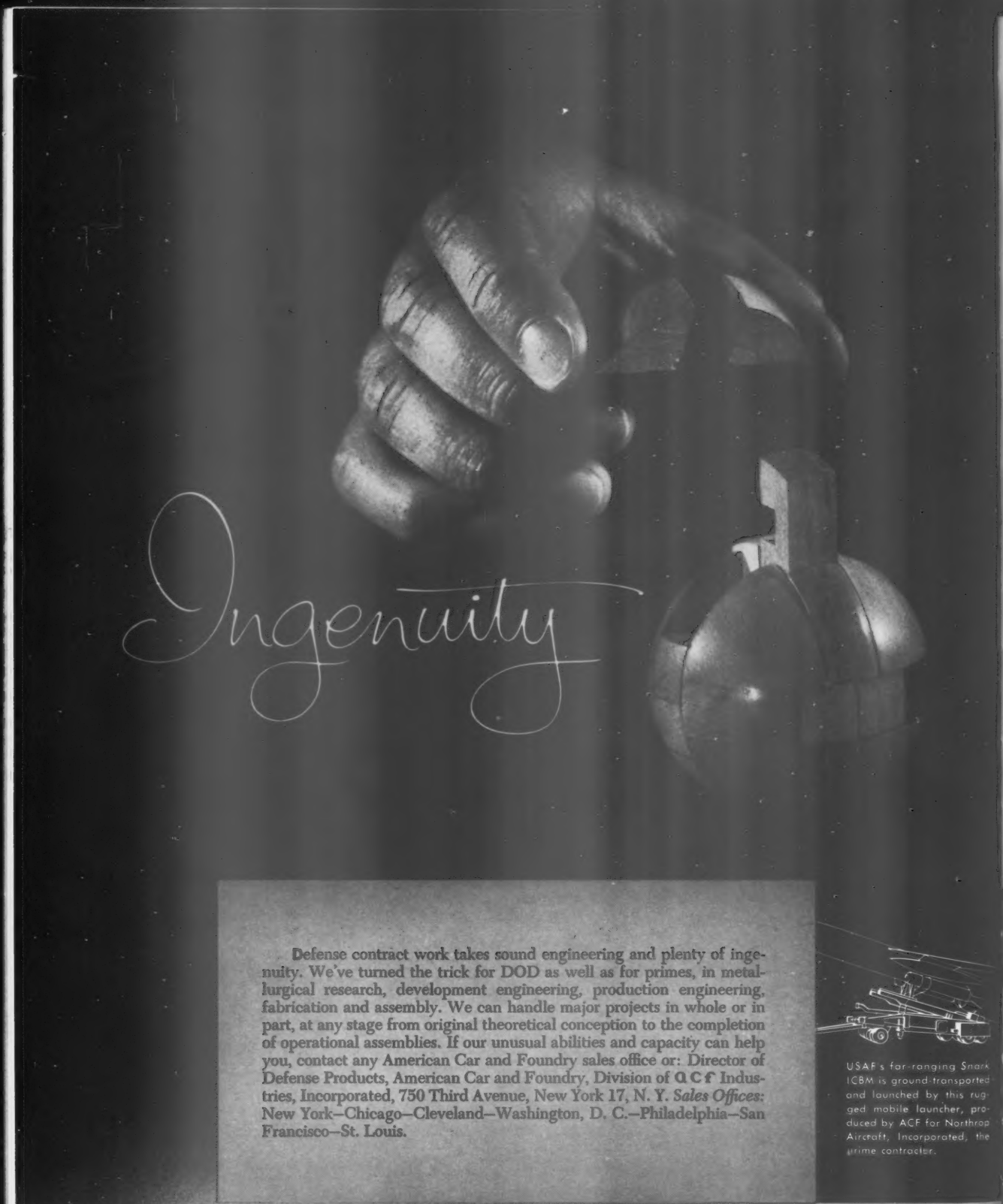
Why the Army Wants a Multi-billion Dollar Face-Lifting ... p. 10

What's Wrong with the Budget Process ... p. 12

Complete Contents ... p. 3



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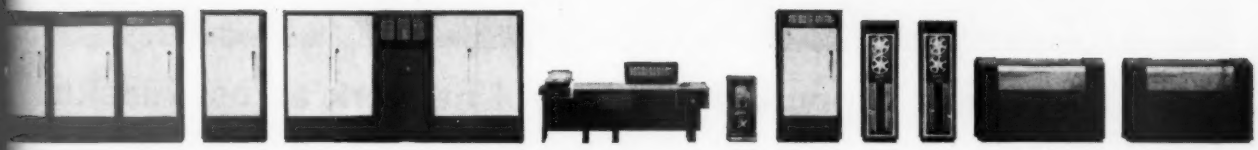

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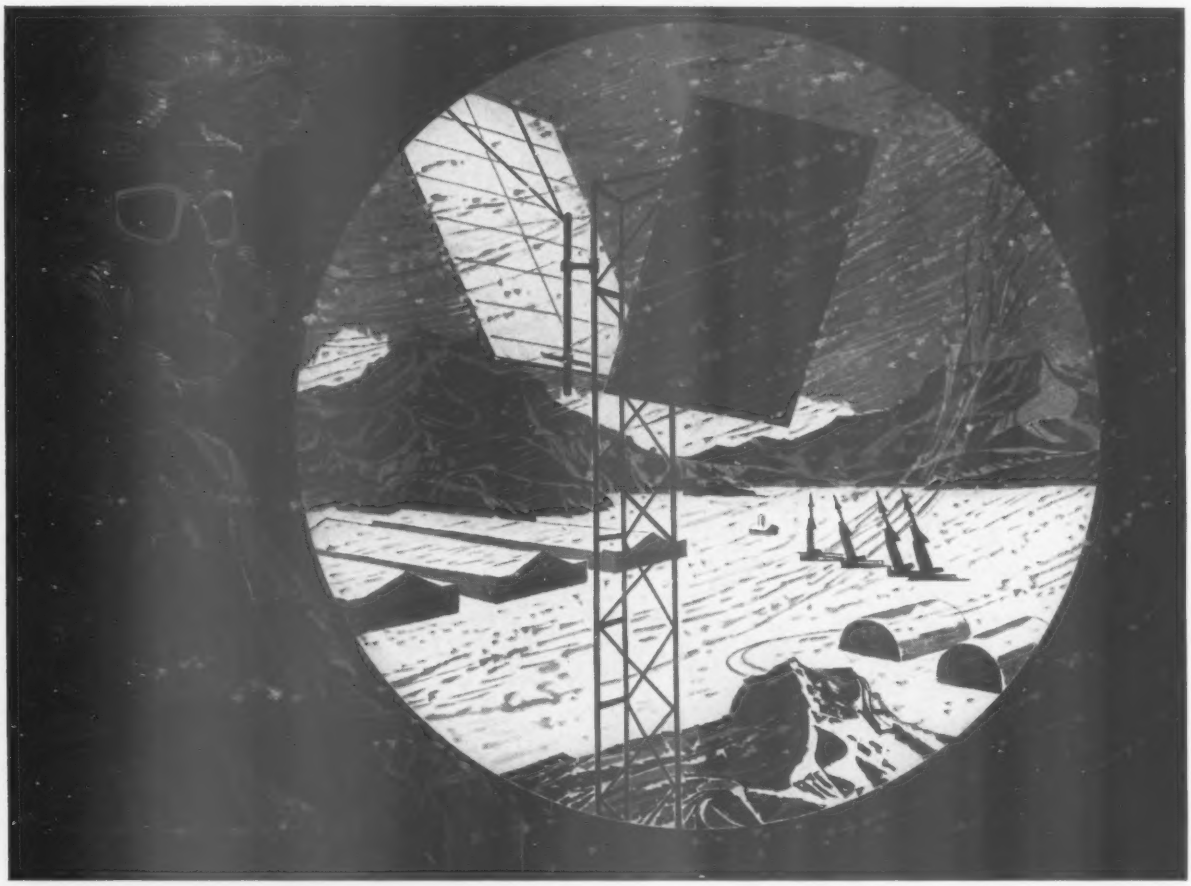

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ARMED FORCES management

PUBLISHED FOR THE ARMY, NAVY, AIR FORCE, COAST GUARD AND MARINE CORPS

FEBRUARY, 1959

Volume 5—No. 5

FEATURES

Why Army Needs New Arms for Limited War 10

In frantic preparation for a general war sunday punch, there is growing concern about the country's preparedness for limited war in-fighting. It is for this reason that Gen. Matthew Taylor has proposed a $15-billion Army modernization plan. What the Army wants is outlined in this story.

What's Wrong With the Budget Process 12

At $40-billion a year, the Defense Budget is the largest single item in the country's spending. How this figure is determined, and the good and bad points of the system are given a thorough airing in this article.

The WSPO Concept: Space Age Procurement 14

With the largest share of Defense procurement dollars, the Air Force must buy increasingly complex and expensive weapon systems. To insure the most defense for the dollar, Air Force has begun buying its major hardware under a weapon system concept. At the present, and for the future, this is how the system looks.

Who Needs Value Engineering? 21

Originally developed by General Electric, the idea of Value Engineering was adopted by BuShips in 1954 to help hold down skyrocketing shipbuilding costs, saved them over $18 million in its first year. Because other agencies—in spite of the proven value—have been slow to pick up the idea, VE still rates as a program with growing potential.

Industry R&D Meets a Dual Goal 28

Burdened with growing responsibility for the Nation's military Research and Development, industry is faced with a problem—How does defense work fit in with the profit motive? Author Dr. Irven Travis of the Burroughs Corp. analyzes the problem in the fourth of a series on military-contractor relationships.

Civil Service: The Management Bogeyman 32

Although this answer to our December editorial may go overboard in criticising one segment of the government, the general fault it attacks is a timeless bugaboo for all management—and fair game for an accomplished pen.

The Budget: Who Gets How Much for What 36

This is the defense budget for fiscal 1960—and how it will be spent under the President's planning. The spending trend is down.

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FEATURED NEXT MONTH

The Case for the Nuclear Aircraft Carrier. . . . How Army Engineers Back up Service Missile Programs. . . . What Defense Buying Does to the U.S. Economy. . . . The Loneliest Man in the Military.

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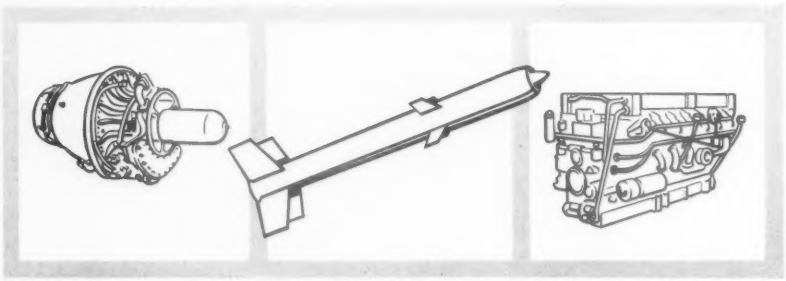

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In My Opinion

Polaris Praised

I wish to thank you for the copy of the editorial "Why POLARIS is Winning its Race Against Time" that appeared in the December issue of your magazine, ARMED FORCES MANAGEMENT. I enjoyed reading the article. It was of particular interest to me since I have recently been briefed by Adm. Raborn on this management control method.

The Navy system is a variation of management control systems that have been used by the Army for some years. The methods employed by the Army Ordnance Missile Command at Redstone Arsenal for statistical control of Army guided missile program could be a possible subject for future editorial.

Lt. Gen. Arthur G. Trudeau
Chief of Research and Development
U. S. Army

Mundel and Science

I think Mr. Mundel has produced a very provocative study, but it is rather difficult to see how one could carry out the basic recommendations he made without a drastic and fundamental reorganization of the entire Defense Department; that is, unless by "management" he is referring to managers at the Technical Service or Bureau level.

There is no question but what he has touched on the fundamental aspects of research management with which there is general agreement, but to apply his reasoning to the Department of Defense leaves many questions unanswered. As long as the Army, Navy and Air Force continue as organizational and administrative entities, research management, as such, must be conducted largely at that level. The Office of the Secretary of Defense is too far removed from actual research activity to function as a manager of research except in limited areas as is the case with the program managed by the Advanced Research Projects Agency.

It would appear that Mr. Mundel's recommendations would certainly apply to the ARDC-Technical Service-Bureau level of research management under our present organization.

Brig. Gen. A. W. Betts, USA
Military Executive Assistant
to the Director of Guided Missiles
Office of the Secretary of Defense

Bouquet for AFSWP

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(*Continued page* 45)

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EDITORIAL

Gambit in Gamesmanship

IT has to do with the budget process, mainly, and it has some inviolate rules: never ask for less than you did last year and for that matter always ask for more than you need (they're going to lop some off anyway); always spend all you receive; describe everything as a "minimum essential requirement;" and above all never, never attribute program shortcomings to anything but a lack of money.

It is a wide open game which countenances propaganda, fakery, cajolery, deals and doubletalk, anybody can play—and it has one big advantage: There are plenty of programs around which, if set out all by themselves, look like "minimum essential requirements." Said one budget officer, "The kindest thing I might say would be that of course we never have enough money for all of them and they know it." Said another, "The utter confusion comes while we sort the 'least minimum essentials' from the 'minimums' and the 'absolutely essentials' in order to get ahead with the program." Its most complimentary title is "Budget Gamesmanship."

Few men below the Secretary of Defense level give up easily in their quest for dollars. Because they are convinced their program is part of the "minimum essential," they rarely quit until the last door of opportunity is closed—and it never closes. The budget process allows, in fact encourages gamesmanship to some extent, provides no real way of shutting it off after it has sputtered a reasonable length of time.

But it is the fault of the players, too, for in the final analysis, budget gamesmanship hurts the total military effort far more than it infrequently helps some isolated program. What is worse, it tends to make top Pentagon brass retain the authority they are going to have to delegate if the budget process, and all military management effort for that matter, is ever to improve. Gamesmanship is, essentially, the art of trying to make the rest of the puzzle fit your particular piece, rather than the other way around. It is the leading exponent of the dogma of indecision.

Statements which amount to gamesmanship are hard to spot. They contain just enough truth—indeed in many cases the whole truth as far as they go—so that they appear unarguable. Take the often-heard complaint, "We need more timely guidance from the top." This is true. But it does not have to be. Timely decisions could be made if there were not so much "buck passing"—an integral part of gamesmanship. (Translated it means "let the Secretary of Defense make the sticky decisions. That way, they can't fry us if something goes wrong.")

Too often it is not so much a matter of having timely guidance as it is a matter of trying to force a change in guidance which does not quite fit individual Service plans—in essence, fighting unification rather than helping it. But more than this, it is an exasperating, even dangerous, encouragement of vacillation. One of the most frequent complaints of industry (which deals with Defense most and needs the answers most often) is that it is very tough to find a man willing to make a decision. Allowing gamesmanship to run unharnessed is one of the reasons.

Respect for the ability and integrity of Navy Secretary Thomas Gates, one of the most respected men in Washington, anyway, hit a new high when he made the painful decision to cancel the Regulus II and Martin Seamaster programs. The hardware worked fine and there was a definite need for it. But in this year's budget terms, something had to give. Cutting probably a month off the decision time, Gates passed up a chance at gamesmanship, solved himself the type of problem too many men in Defense operations all too often have passed on up the line.

Gamesmanship is great for debate, but death on decision—and if ever there was a time when Defense needed decisions, it is now.

Bill Borklund

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GR-401

Washington Background

PENTAGON IS WONDERING WHY CONGRESS, PARTICULARLY THE HOUSE, has evidently decided to declare open season on the Defense Department. Leading the charge is Carl Vinson's House Armed Services Committee. On its docket are looks at: (1) procurement, use, and disposition of materiel, equipment, supplies and services, and the acquisition, use, and disposition of real property; (2) military and civilian personnel; (3) laws, regulations, and directives; (4) use of appropriated and non-appropriated funds; and (5) scientific research and development in support of the armed services.

THIS IS ONLY THE BEGINNING. Vinson also intends to renew last year's attack on Pentagon procurement policies. Major bone of contention will be negotiated procurement which Vinson wants limited. In this respect he may run head-on into Sen. Leverett Saltonstall who has presented a bill to the Senate which tends in the opposite direction.

AMONG THE OTHER HUNTERS: House and Senate Space Committees which want to know about "lagging U.S. development in outer space;" House Government Operations Subcommittee interested in management of the missile program; House Small Business Committee which has already taken a cut at weapons system concept. There are other minor ones and will be more. What worries some Pentagon officials: with all this testifying, when will there be time to get the work done?

PIERCING COMMENTS ON THE SPACE RACE WERE MADE by Dr. William H. Pickering, director of the CalTech Jet Propulsion laboratory (the one National Aeronautics and Space agency took over), in late January. In Philadelphia to receive an award from the National Reliability & Quality Control Symposium for his work in space technology, he said afterward that in-fighting between Advanced Research Projects Agency, NASA, and some others was threatening our chance to achieve a unified space program. "This is our real problem," he said. Pointing out that the U.S.'s largest successfully fired Atlas was about as big as Sputnik I, he added, "We are behind because we started later. They fire fewer (missiles), make more real progress, because they have a unified program."

SOME PENTAGON BUDGET PEOPLE ARE PRIVATELY APPLAUDING PRESIDENT Eisenhower for his emphasis on a balanced budget—for a unique reason. Summing up the comments: "He is evidently convinced that inflation is more dangerous than anything else we might face. He didn't have to stick his neck out. He could have waited one more year and, with the predicted economic upsurge, gotten more defense spending and a balanced budget without any effort."

SPEAKING OF BUDGET, NAVY HAS STARTED A CHECK OF ITS ACCOUNTING SYSTEM, feels it may be too complex (although it is no more outstanding than the other Service methods in this respect). Study started when someone noted that the Office of the Chief of Naval Operations worked 15 hours a day, seven days a week on the current one. Study goal: cut reporting time, still provide top management with more meaningful data.

BUREAU OF THE BUDGET, GOVERNMENT ACCOUNTING OFFICE, or, possibly, Defense Comptroller's shop may (as soon as budget problems get back to a more normal state of confusion) take a sharper look at some Service programs that have been financed through what amounts to installment or "buy-now-pay-later" plans. Reason: In practice some programs have come dangerously close to obligating the government to future costs without prior Congressional approval—a stunt you can go to jail for.

HINT OF JUST HOW FAR UNIFICATION IS GOING in the new unified command setup came from Defense Secretary McElroy in a press conference one day last week. Asked, as an example, if head of the Air Defense Command could relieve a subordinate commander from another Service of duty "without going anywhere else in his command," McElroy said, in effect, "He's the commander, isn't he? I can't understand why there would be any question about it."

Defense Budget Critics Muzzled by BOB Memo

Bureau of the Budget has laid down the law—there will be no revolt in Defense Department against the President's budget. This edict is contained in a secret memo sent from Budget Director Maurice Stans to Defense Secretary Neil McElroy, and released to the public by Rep. Daniel Flood (D-Pa.).

In the past, Flood has been critical of the part played by Bureau of the Budget in spending appropriated funds. Flood charged that the memo was in direct opposition to provisions in the Defense Reorganization Act passed last year, which said that upon informing the Defense Secretary of their intentions, military leaders could appeal to Congress on differences on Defense policies.

The memo stated that Executive Branch personnel are expected to support the President in his budget, and that "it is expected that witnesses will carefully avoid volunteering views differing from the budget, either on the record or off the record.

"While direct question at hearings must be answered frankly, it is expected that witness who feels that he must set forth a personal view inconsistent with the President's budget will also point out that the President's judgment on the matter was reached from his overall perspective. . . . Please see that a reminder of this reaches all officials and employes who participate in hearings on appropriations and on legislation directly related to budget proposals. . . ."

Legislative Program Outlined by Dechert

Defense Department will submit roughly 71 bills to Congress this year, with 18 classed as "major" by Defense Department Counsel Robert Dechert. Dechert outlined these programs before a recent meeting of the National Security Industrial Association in Washington.

Number one on the list will be a bill aimed at insuring defense contractors against nuclear or other hazardous risks in connection with production contracts.

Other key industry measures to be introduced include (1) Renegotiation—Dechert told the meeting he felt extension of the Renegotiation Act was necessary, but added that the Defense Department bill would probably support minor changes allowing contractor appeals beyond Tax Courts, and acknowledging the growing use of incentive contracts.

(2) Dechert indicated that there would be new procurement legislation, referring to the Saltonstall bill. While he did not say whether DOD would support the bill, it is known that DOD has had an active part in preparing the bill for Congress.

(3) He said DOD would support action to handle the implications of the Supreme Court's Murray case, which made Government property in the hands of a contractor subject to personal property taxes under certain conditions.

Vinson Promises Attack On Pentagon Buying Rules

In what can be considered the opening gun of the perennial attack on Pentagon procurement policies, Rep. Carl Vinson (D-Ga.) has stated he will propose legislation to limit negotiated contracts.

Although the Georgia Democrat offered no details, the bill will probably carry the main provisions of a similar bill he introduced in 1957. This bill, drafted by Vinson and Rep. Hebert (D-La.), gave rise to extensive hearings and no action.

Under this bill, the President would have been barred from declaring national emergencies. The reason: under the Korean Emergency Proclamation, procurement officials were allowed to take exception to sealed-bid buying. Vinson charged that these officials were overdoing the amount in which they used this.

Other provisions would provide for re-definition of "negotiation" to insure open competitive bidding. Also, the Pentagon would have been forced to announce publicly all negotiated prices after the bidder was named. Under present DOD methods, only the winning bid is announced.

Manpower Group Proposed At White House Level

A White House-level organization to work with problems in developing and using highly skilled manpower has been proposed by the President's Committee on Scientists and Engineers. The committee said that these problems have intensified, rather than diminished over the past two years.

Until the new organization is set up, the committee said key programs already developed should continue without interruption. These programs include (1) conservation and effective use of existing scientists and engineers through "utilization clinics;" (2) Organization of state and local groups to work to promote long-range improvement in science and mathematics education; (3) development of adequate data and statistics on scientist and engineer supplies.

Senate Will Probe Defense/Space Work

A thorough investigation of the nation's defense and outer space programs will begin sometime this month, according to Sen. Majority Leader Lyndon Johnson (D-Tex.). Conducting the probe will be a Joint Senate Preparedness-Space Committee.

The hearings will cover two main themes, said Johnson. "First, is the United States doing everything it reasonably can and should to insure the defense of this country and the free world against military aggression? Second, is the United States doing everything it reasonably can and should in exploration of outer space?"

Federal Space Council Planned by President

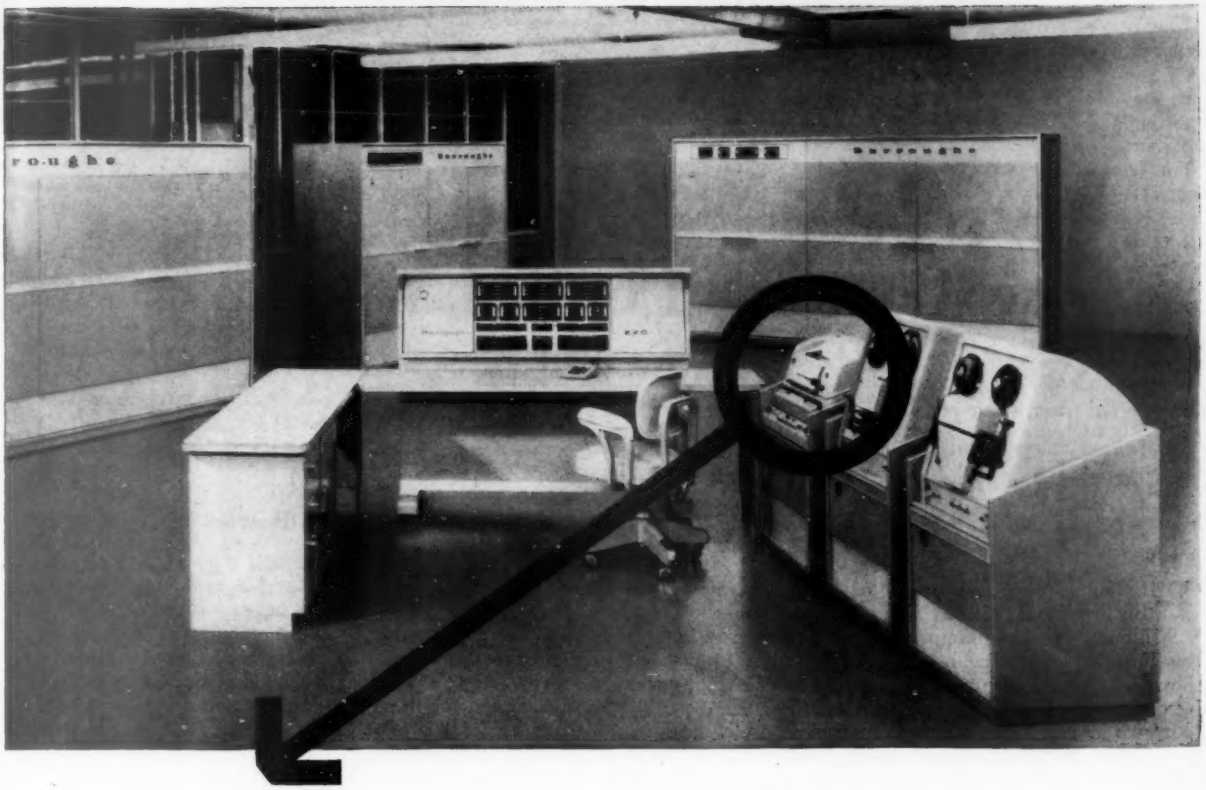
President Eisenhower will sign an executive order creating a Federal Council for Space and Technology to advise the Cabinet on programs requiring interdepartmental and government-wide policy making and coordination.

To include members from all departments having substantial research activities, the Council is an outgrowth of recommendations made by the Science Advisory Committee. This committee will aid the new council in an advisory capacity.

There is speculation that the Council could evolve into a Cabinet level Science group. The need for this Council was stressed in a recent speech by Dr. James Killian, in which he also set the following future needs for scientific progress.

(1) Funding and planning of "multi-million dollar research instruments . . . such as particle accelerators for nuclear physics and of centralized research institutes which are needed or proposed in various fields."

(2) Expanded translation services, dictated by the tremendous scientific advances now taking place in Russia, and the foreseeable scientific growth of Red China.



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Why Army Needs New Arms for Limited War

In the much-publicized race for space, there has been growing concern about our limited war capabilities. This is the Army story . . . .

by Fred Hamlin

THE limited war strike forces of the United States had a busy year in 1958. In addition to the Lebanon crisis, U.S. limited war task groups were called into play both in the Formosa straits, and on a smaller scale to make a show of force in Central America when Vice President Nixon was received by angry mobs in Venezuela.

It was a year that showed unmistakably the need for preparation for less-than-general-war conflicts. 1958 was a year indicative of the future, and it was a year that showed the need for modern, mobile, compact striking forces. In this light, the year threw up a plain challenge to military planners—what does it take, and can we provide the balanced forces that are needed to maintain world peace and national prestige. In part, the challege was met.

Just two months ago, Army Chief of Staff Gen. Maxwell Taylor told a Pentagon news conference "It is certainly no lack of will . . . All we need is the money and we can be completely modernized."

The General was speaking of a large ($15-billion) Army-wide modernization program, aimed at bringing the Army fully up to date—and keeping it there for the next five years. Spending rate would be $3-billion per year.

This was two months ago. In the meantime, the President has announced his budget, in which the Army got $1.37 billion for procurement and $1.047 billion for research and development. According to Taylor, it would be impossible to accomplish the entire reorganization on an $8 billion yearly budget. It does not look as if $9.557-billion is much closer to the mark.

It is mis-leading and incorrect to say that money alone will do everything that must be done to modernize the Army. In point of fact, General Taylor has announced a five-point plan for Army modernization: (1) The modernization of appropriate equipment; (2) The improved strategic mobility of limited war forces; (3) The preplanned use of air and sealift; (4) Expanded joint planning and training; (5) The publicizing of our limited war strength.

First, he calls for the modernization of appropriate equipment. In this area, money comes most acutely into play. The problem, says Taylor, is essentially this. "Approximately 60 percent of the dollar value of the Army's inventory . . . was procured during World War II or the Korean War; 10 percent of it is of pre-World War II vintage. As a result many items have reached a point where they are no longer economical to maintain or are incapable of meeting the stepped-up requirements of today's or tomorrow's possible war."

Equipment needs fall into five areas: (1) Firepower, (2) Mobility, (3) Communications, (4) Target acquisition/fire control and (5) Logistical support. In the first of these areas is considered second generation missiles, such as Pershing, Sergeant and Nike-Hercules.

The need for these missiles is underlined in a remark by Chairman of the Joint Chiefs of Staff Nathan Twining before the last meeting of the Association of the U.S. Army. Said Twining, "When I speak of mobility, I am thinking of both rapid movement and fast reaction. The Redstones, Corporals and even Honest Johns of today are not really mobile in the sense of rapid movement in a battle area. Nor do they yet possess the capability for fast reaction. Firepower is not much good unless it can be applied quickly and flexibly."

Also in the firepower area, there is a need for better medium tanks, self-propelled 8 inch and 155 caliber guns, and higher-velocity, smaller-bore weapons for the individual soldier. In this line it is interesting to quote Lt. Gen. Arthur G. Trudeau, speaking before the same AUSA meeting: "You are all familiar with the new lightweight family of weapons that have been developed for the infantry soldier. Still lighter weight, smaller caliber, and higher velocity weapons are now being evaluated. I do not know how long the conventional type rifle will be with us."

The problem of tactical mobility, as pointed up by General Twining is of prime importance to the Army. According to Lt. Gen. Arthur G. Trudeau, "Seldom in history has a weapon or a weapons system in itself been decisive. More often what has been decisive is the tactical system developed to employ a weapon or a weapon system. This has been true in the past and is equally true today. Part of the improvement in our tactical systems has been increased emphasis on ground as well as air mobility."

In the area of tactical mobility are the self-propelled weapons mentioned earlier, weapons and ammunition carriers, boats and more and better trucks. In line with the mobility concept is a truck mounted atomic power plant that can be hauled over terrain that any ordinary tractor-trailer can handle.

Partly in the area of mobility and partly in the line of communications and target acquisition is the perennial problem of Army aviation. What is needed: Low, slow reconnaissance aircraft, which will enable the Army in combat to find out just what is going on in the enemy camp. Top Army officials have pointed out that the supersonic aircraft currently used for photo-reconnaissance are simply

too fast to do the Army much good—they cover the ground so fast that fine detail is lost in normal ground clutter.

Next, the Army is anxious to do away with the existing 5000-lb. limitation on Army aircraft. With the exception allowed on the de Havilland Caribou, Army has high hopes in this area, but they are ready to admit, as has Lt. Gen. Trudeau, that the limitation is "About as useful to us as covered wagons."

Trudeau continues, "The air vehicles which we seek are not the sophisticated aircraft which are used by the Navy and the Air Force. Rather, they are simple, rugged machines designed to operate in a combat area and just above the nap of the earth. They have the characteristics of short, or vertical take-off and landing. They must be simple to maintain, economical to operate and, for the most part, have low cost."

"Battlefield surveillance," according to Lt. Gen. Trudeau, "is always a critical factor for any combat operation. It is one of the first steps in producing intelligence for the commander so that he can plan a tactical operation properly. Surveillance is also a difficult field for developments because it must necessarily be based on enemy capabilities —in equipment, weapons and mobility . . . First, we have air vehicles to do this job. The Mohawk is a fixed-wing aircraft designed for shallow reconnaissance penetrations. It will cruise at two hundred knots, and take off and land on unimproved fields in the combat area. It can carry visual photographic, infra-red and radar reconnaissance devices. The pilot has armor protection in this rugged aircraft."

In communications—which Gen. Twining has called "the weakest link in all services"—there are many Army needs, many tied in with surveillance. What the Army wants are ground/air radios, vehicle and command radios, radar, infra-red devices, radio relays, Missile Master equipment, side-looking radar, and doppler devices. A major step forward in this area is the recent development of air-transportable communications centers, which can be set up virtually anywhere that there is room to put them down.

Assuming the Army were to get all of the new equipment that it wanted, which does not appear to be the case in the immediate future, there is still the essential element of logistical support. Army has given considerable thought to this phase of operations, and has set up several requirements in this area. Such items as cranes, bulldozers, forklift equipment, collapsible water and fuel tanks, water purifications systems and similar support equipment are needed here.

Directly applicable to this area of Army needs are remarks made by Gen. Nathan Twining, Chairman of the Chiefs of Staff: "I sometimes get the feeling that much of our equipment today is unnecessarily complicated. Are we making equipment so technical because it is supposed to be so today? I think we have introduced too many refinements and comforts into much of our equipment with resulting problems of maintenance under field conditions and of training, not to mention the factor of cost. I would urge that we not lose sight of the great advantage of simplicity . . ."

It is in strategic mobility that Army is faced with one of its most vexing problems, as stated by Taylor in his second and third points. In the area of strategic mobility, the Army must rely to a large extent on the other services for its air- and sealift. Says Gen. Taylor, "As the Army lightens its loads, we hope that our Sister Services will modernize the sea and airlift upon which we depend for our strategic mobility . . . At the present, the Army has no indications of the lift which would move its spearhead forces in an emergency."

Directed primarily at the limited war situation, the foregoing is a modernization which would cost virtually nothing but a little time and planning, and the benefits to be gained are well worth the trouble. "When I look at the four-engined aircraft—the so-called strategic aircraft available in all the services—in MATS, in the Navy, in the Air Force and in the Marines, and then look at the airlines, I am impressed that we have large assets. The real question is: Do we have the means to assemble these assets fast enough, and when the time comes what will be the decision as to their allocation . . . there will be lots of customers for airlift. Some predesignation of air and sea elements for planning purposes would materially shorten the time required to get the initial forces on their way. The actual lift would not be released for use without the specific approval of the Joint Chiefs of Staff.

"I do not suggest that such preplanning should cause a certain number of planes or ships to stand idle, marked *For Army Use Only*. That makes no sense to me. However, it would make a great deal of sense if the Army knew in advance that in an emergency, a given amount of lift would be available at designated airfields and ports ready for movement on JCS approval. This knowledge would contribute materially to realistic planning for the rapid reaction of our spearhead units to limited war situations."

Next in line in General Taylor's five-point program is the expansion of joint planning and training: "Such joint action might include the checking and testing of plans for overseas movement of forces, the verification of their readiness, and the actual movement of token forces as training for emergency situations. I should like to feel that we are as effective in meeting the complex requirements of limited war as SAC is in meeting the requirements of general atomic war."

The problem is, again, one of priorities, General Twining told a meeting of the AUSA that "I doubt if there is any man in this room who has ever had all the means he would like to have had to accomplish some objective . . . within the overall military structure we must provide those capabilities which we consider most important." As if in answer to this, Gen. Taylor said at a later date: "One accepts the decision made . . . I am a good soldier, and I accept that decision and, taking the resources provided, try to make the best Army possible."

The final item on General Taylor's modernization plan, and perhaps the most ironic is "the publicizing of our limited war strength." He explains, "To many observing America from a distance, we appear to be a country prepared to fight in case a general war should be forced upon us, but with unknown resources for a lesser response. It is highly important from a psychological reason to publicize our capabilities to react with weapons and means short of those associated with massive retaliation."

In winding up a recent speech in which he discussed his five points for Army modernization, General Taylor had this to say: "I would stress again that I am not preaching a purely Army program. All Services would be involved in this five-pronged effort to improve our effectiveness in limited war. It is an essential extension of our national policy . . . Although we have significant assets now to come with limited wars, these can and must be improved so that it can be made crystal clear to both our friends and foes that we can respond promptly with proper weapons and proper forces to any challenge."

The President's budget offered a scant $1.024 billion to the Army for procurement, and will unquestionably cut the heart out of the modernization program for the Army. If the program does not suffer in quality, it is certain to be drastically slashed in quantity. On the other hand, there are important points in Gen. Taylor's program which do not necessarily call for fund outlays. Specifically, it is possible for the Joint Chiefs to pre-plan for Army airlift, and it is equally possible for more adequate publicity to be given to the country's limited war strength.

What is Wrong with the Budget Process?

What is good—and bad—
About the most appallingly
Complex process in Defense?

by Bill Borklund

DURING the Civil War, Abraham Lincoln's Union Army needed only five sheets of paper to outline a one-year, line-item budget (handwritten) of $1 billion. Army comptrollers now make an annual pilgrimage to Ft. Benjamin Harrison, Indiana, to gaze at this document in awe.

In 1932, Democrats reviled the Republicans for allowing the national debt to climb to an "exhorbitant" $9 billion. This year's Air Force budget is almost twice that amount and many of the same Democrats are insisting it's not enough.

In 1944, the Army's line-item budget made a stack of paper four feet high, had to be trucked to Capitol Hill, and contained one item which would have taken care of 1863 all by itself. The item: "Manhattan Project . . . $1 billion."

You can find a good deal of highly plausible argument either way on whether this 96-year-old evolution in military budgeting represents progress. Talking to any one of the thousands of men who prepare, document and approve the annual military request for dollars can lead to as many different answers as there are men to talk to. A novice, looking for facts, soon begins to wonder if everyone is talking about the same thing.

Now, in 1959, the starting whistle has blown once again on the "Great Art of Budget Gamesmanship." In the halls of the Pentagon, on Capitol Hill, and on all the thoroughfares, in all the restaurants and limousines in between, responsible men will argue (about the same program) that "$1 billion is niggardly," that "$500 million is excessive"—in essence, how much is enough?

And during the Great Debate, President Eisenhower will be crucified for being "short-sighted," Defense Comptroller McNeil will take a few unwarranted knocks on the head, the Bureau of the Budget will be hanged several times in effigy, and through it all the American public will search in vain for the irrevocable answer to who is right.

In dissecting the budget process, there are three things to keep in mind:

1—The budget is more than an arithmetic compilation of what every subdivision of Defense considers its requirements. It is a pulling together at one time and place of all military programs and activities, rated according to their considered priority. Congress approves the relative merit of military programs, not the bank balance.

2—The military budget, by its very size if nothing else, reflects or is reflected by every change in the military environment. A rifle shot in Lebanon, a dip in the Wall Street stock market, labor strike in Detroit, an increase in postal rates—all are paid for with more or less defense.

3—The appropriation by Congress and subsequent apportionment of funds by the Bureau of the Budget is a process established by law. However well it may or may not allow Congress to control the purse strings, they set it up.

Why is the process set up as it is? What's good—and bad—about it?

To analyze it properly, particularly in this short a space, we must first clear away some underbrush. The most polite name for it is "gamesmanship." Stripped of its own drum-thumping propaganda, gamesmanship is an attempt to alter and/or ignore the budget's environment. Probably the best description of these "facts of life" which gamesmanship seeks to circumvent came from Brig. Gen. Robert J. Friedman, Director of the Air Force budget, who said:

"We find the Air Force today a strange anomaly. Alongside the latest technological equipment we have barracks heated with pot-bellied stoves. The Air Force currently finds itself unable to provide $500,000 out of an appropriation of over $4 billion for the rehabilitation of barracks which have not been in use for upward of three years and which are now required to house a strategic unit.

"The answer is not merely to get more money, for as Vice Chief of Staff Curtis LeMay has indicated, we will continue to operate in an environment of 'not quite enough.' The answer also does not lie in the simple statement: reduce the program, for each of us has a personal stake in maintaining the program at the highest possible level. The answer must lie at least partially in management of the resources we have allocated."

The Prosecution's Case

The budget is essentially a two-sided equation, i.e. programs equal dollars. Like any mathematical equation, to solve it, one side or the other must be given. The problem, say the critics, is that neither side is given. What are "requirements?" In just three words you are launched into a discussion of guns vs. butter. The current budget proposal could have been prepared on a dollar ceiling of anywhere from a minimum $35 billion to about $50 billion—and the same arguments could be used to justify either figure.

And no matter what the figure, men in the field will be able to throw rocks at it. The game of budgeting is a game of prediction—except that there is no provision in the review process for inflation. But it is also a game in which nearly all the players use different sets of rules.

Biggest single attack made by critics of the process is that it amounts to exercise of authority (in the Bureau of the Budget) without responsibility. We will get to the rebuttal later. Here is the attack:

Said one officer, "If we assume the Defense establishment is filled with thieves, the process is very good." Another described it this way:

"This game we're in is the old story of feeding the donkey half again as much each day as you did the previous day. Each day he lives, 'we have proven,' they say, 'that he can live on half as much.' Eventually, of course, he dies—and the guy who held the reins is criticized, not the guy who fed him. When he dies, we get IMPACT and this is what is needed to get money, but by then it is too late.

"The budget process is a one-way street of constantly decreasing concentric circles to 0. We can talk all year about the techniques—how do you

slice this—but someone must put a restraint on requirements. There is no way to prove what these are, short of all-out war. So the President gives us the other side of the equation—the number of dollars. But—any responsible man will try invariably to get more out of his share of the dollars. He starts the decreasing circle.

"Reviews gradually shrink the dollars, usually in the cause of 'better management,' until even the previous requirements are no longer possible. Ultimately, we end up again with a formula of two unknowns. And always it grows smaller. We have lived with a generally low support level so long, we don't notice it any more. Then they go in, find one boondoggle, and use that one to kill the whole program.

"This is the pattern of the donkey, and when we complain, they always say, 'I'm sorry. You go back and change the donkey'." The critics, and they can be found as high up as just below the top crust of Pentagon policy, have a point. How good is it? Here's the rebuttal:

Case for the Defense

Back in the 19th century, Congress decided it should have a Capitol building. It appropriated some funds to start the project and told the President to hire an architect. He did. One year later, the architect walked into Congress waving a contract signed by the U.S. Government. He said, basically, "I was hired to build a Capitol building. The funds you appropriated last year have been used up. I would like the rest of the money you agreed to pay to finish the job."

Although Congress had not approved it, the architect had a contract. He got his money.

So, in 1870, they passed a law that said, in effect, they would approve fund requests on the basis of obligational authority, i.e. "You will not start a program unless you have been given all the money needed to complete it." They have been polishing and sharpening this law ever since, re-enacted it in its present form just eight years ago. Nor do they think it advisable to let go after obligational authority is granted.

For the law says, in part, ". . . funds available for obligation for a definite period of time shall be so apportioned as to prevent obligation or expenditure thereof in a manner which would indicate a necessity for deficiency or supplemental appropriations for such period; and all appropriations or funds not limited to a definite period of time, and all authorizations to create obligations by contract in advance of appropriations, shall be so apportioned as to achieve the most effective and economical use thereof."

It is the President's responsibility to carry this out. He does it through the Bureau of the Budget. Thus we have the process—appropriation in Congress and apportionment in BOB. But it is more than a way for Congress to control spending. In such a mammoth setup as the U.S. Government, it is the most effective weapon available for Presidential control—short of setting up a benevolent dictatorship.

The control becomes critical when you realize that Congress, for the past few years, has never really changed the President's budget request much—in terms of total dollars. Primarily, they just have to take something out here and put it back in there.

And the House Appropriations Committee agreed in 1951 when they said, in part, "Appropriation (is) only a ceiling . . . the administrative officials bear the final burden for rendering (their) service within the ceiling figure."

Moreover, the constantly changing nature of program emphasis, the length of time it takes to prepare the budget, means it is frequently in connection with the apportionment request that some parts of the final "shopping list" for the year are presented for the first time.

People are indeed confused if they labor under the delusion that the money Congress appropriates is spent that way during the fiscal year to the last nickel. Nor should it be. To insist on it would freeze the military in a straight jacket of programs many of which are a year-and-a-half old. (Right now, Defense is struggling with three budgets: Still struggling with the FY '59 one, they are preparing justification for the FY '60 one, have begun formulating next January's proposal for FY '61.)

Says Defense Comptroller McNeil, "the cruix of the matter is the difficult task of reaching the proper decisions in these days of rapid change, technological progress and frequently conflicting military and technical advice." He is on target here. A record check shows that apportionments actually go out quickly.

There is no question that the importance of budgeting and the budget process has increased. (So much so in fact that the Navy is re-examining its whole procedure; the Army has moved more and more into a Headquarters staff-directed budget, and the Air Force Vice Chief of Staff has kicked off a concerted effort to get all the "Indians" thinking and acting alike.)

There is some convincing argument that programs are too far away from dollars, particularly in the Joint Chiefs of Staff setup. One side says there is not enough money for the programs; the other, that we program beyond our resources. Somewhat like the blind men finding the elephant, both sides give different reasons but both recognize that there is a gap.

Now that the reorganized JCS will presumably have a bigger voice in force levels, look to the unified commands more than the separate Services for program needs, this problem can start ironing itself out, or get worse—depending on whether or not they recognize it as critical. There will be no indication of this probably until the 1962 budget. (To start with the '61 budget, JCS would have to be handling the problem now. Reorganization being wheer it is at the moment, they cannot.)

There is probably a great deal of over-reporting—for value of data received. (Navy alone prepared 15 separate budgets last year, not counting a lot of little internal looks here and there.) The budget process is started as much as 18 months before the fiscal year starts. Revisions are pumped in constantly until it goes to the House. Then, as though it will fool anyone—which it apparently does—the Services freeze with their proposal until after it reaches the Senate. The reason: they don't want to appear contradictory.

The recent BOB memo to Defense, stating, essentially, that there will be no discussion of budget requirements except in the President's terms, called a "gag rule" by many, is really nothing more than a twix to remind them of the routine. The Services already know it. It's part of the game.

There is a need for earlier decisions—but there are too many men who say they need earlier decisions who could make them themselves.

There is a need for uniform budget formulation procedures among the Services.

There is probably some middle point in all the philosophies about budget processing which is closer to right than we are now. The review process has hurt many programs which, it turned out, needed doing—if we were going to do anything at all about national security. On the other hand, it has killed many proposals which deserved killing.

Which side of the ledger totals more is an unanswerable question. And it *has* provided management control—a control for which its critics, significantly, have never produced a better solution than: "Don't ask questions. Just trust in me."

But whatever you think of the budget process, be careful of the man who states categorically it is all black. Tomorrow you will talk to a man who can prove it is all white.

The WSPO Concept: Space Age Procurement

The B-58, first product of the concept.

Air Force has high hopes for its Weapon System concept, and has already begun a series of sweeping changes in its relations with industry. This is how the set-up looks . . .

IN its head-long rush into the future (a rush triggered and led by military projects), the U.S. is assembling a wide array of satellites, missiles and other new equipment, each one more remarkable and vastly more complicated than its predecessor.

Little-noted behind this barrage of headline-making hardware, but in a sense a great deal more important, has been the just-as-rapid change in the way this hardware is built. In hardware procurement and support operations, a new language has evolved. Among the new words: weapon system and weapon system integration, subsystem, complexity, reliability, subcontractor, single manager—words a military man rarely mentioned less than a decade ago.

The words are reference tags to an idea so rapidly developing that even among its primary backers, the Air Force, its full implications are, to a large extent, still hardly realized. It's called, variously, single prime contractor concept or Category I procurement.

It means dovetailing, or integrating according to a plan, various lines of development to achieve a self-sufficient instrument of combat—a weapon system, of the most advanced equipment at the earliest possible date at minimum cost. Certainly, this goal is not new, except possibly for the name. What is new is the unprecedented responsibility now delegated to industry by military procurement agencies.

Product of several years of brain-twisting thought and several months of internal Air Force selling, it amounts, in effect, to hiring a prime contractor to do 100% of weapon system management from research to production.

The concept developed fastest in the Air Force because the Air Force ran into the problems first and fastest. Within the coming year, it may invade the entire military system. (It already has in some cases, such as the Fleet Ballistic Missile program and, to some extent, the Army's Sergeant and Pershing missiles.)

Back in the ancient days of World War II, new weapon procurement methods were comparatively simple. Built to military specifications, components were GFAE-bought (see "The Language" at right) and the Air Force, essentially, just hired a company to put them together. But in marrying components, the system tended to get out of hand. For instance, a power plant might need a bigger generator than its intended airframe could handle. This meant a bigger airframe, which, in turn, meant a bigger power plant to pull it. Without strict, but costly, and time-consuming controls, the process became never-ending. Component builders tended to lose sight of the ultimate weapon goal, tried instead to build the best piece to the puzzle. The result often was not a clean fit.

(Some Pentagon wags maintain this was how the fighter-bomber evolved. It started out to be a fighter, was almost a bomber before the system caught up to it and blew the whistle.)

With the coming of the B-58, configuration demands, the complexity of blending various systems, became so great, that the weapon system development concept was born. Its goal: to drag the last bit of contractor know-how into design, maximize use of state of the art.

Not counting several hundred minor equipment suppliers, over 5000 engineers at Convair and among its subsystem vendors took the first step into the new system in working on the "Hustler." The result, says the Air Force, was a weapon that would not have been possible under the old procurement operation.

Even at that, the concept was at a comparative crawl when the B-58 was being assembled. Today, its procedures are more formalized. It has learned how to walk. And even though it has not yet started to run, its impact has been impressive. The concept has forced a shake-up in top management of entire companies; forced big business to take a closer and more objective look at its sub-contract suppliers.

To quote the president (J. L. Atwood) of North American Aviation, Inc., which is prime on the first two major systems—the B-70 and the F-108—being built full-fledged under the concept:

"Most defense contractors, ourselves included, have at one time or another complained about some aspect of Governmental procurement practices, usually with the implication that pri-

vate enterprise could and would do it better if given the chance. Now we have the chance and it is important for many reasons that we live up to our claims."

His prediction on the B-70: It "will probably represent the greatest coordinated weapon system effort in the history of our industry."

Although the concept will become increasingly important in all military support operations, its first critical impact has been in letting contracts. The process is, basically, two-step.

1—Picking the Prime Contractor

Air Force starts shopping for a weapon system by letting minor feasibility study contracts. If the study results are promising, AF invites the most likely prime contractors to present their concept of the weapon, subsystems, support equipment, possible special facilities required for test or construction, subcontractor structure —in essence, their total Management Plan for delivering the entire system. (Deciding what contenders to invite is not too tough. Weapon system projects are multi-million dollar efforts. The number of companies which could handle such projects in this country amounts to a comparative handful.)

Then AF invokes what they call a Source Selection procedure, comprehensive product of two years work. An AF Evaluation Group of approximately 70-80 persons, varied depending on weapon system complexity, performs a merit rating on the various elements (concept, company management, capability to produce, subcontract structure in general terms, etc.) in each contender's plan. Group personnel come from Air Materiel Command (1/3), Air Research and Development Command (1/3), weapon using commands (1/3), and if occasion requires, one or two men from USAF headquarters (Deputy Chiefs of Staff, Materiel and Development offices)— and possibly a man from some other concerned government agency such as the Atomic Energy Commission.

After a two-to-three week study either at AMC or contractor sites, the Group submits its findings to a Source Selection Board. Source Selection Board, using pre-weighted values for each factor (values not disclosed to the evaluation group), recommends to the Commander AMC, ARDC, and the using Command, a prime or primes. Each commander forwards his selection to the Air Force Chief of Staff with his own comments and USAF picks the prime—although its decision usually involves Defense Department and Congress because of weapon system dollar cost and importance.

The Language

Weapon System Procurement is a vital part of the management concept. To understand the concept, there are some details you should know:

The Alphabet

Like all military agencies, weapon system people have their own peculiar letter language. There are two that crop up frequently . . .

1—GFE—for Government-Furnished Equipment, i.e. items acquired directly by the Government and made available to the contractor. Air Force sometimes throws an "A" into it (GFAE) to denote equipment furnished by the Air Force to a contractor for inclusion in an air vehicle.

2—CFE—for Contractor-Furnished Equipment, i.e. all items, except GFE, furnished by a contractor in performance of a contract.

The Categories

Like the alphabet language, Air Force has a Category phrase it hangs on the various methods of procuring materiel. There are four . . .

Category 1 (CFE)—by contract between the weapon system contractor and the Air Force.

Category 2 (Associate Contractor)—by contract between subsystem or equipment manufacturers and the Air Force, *utilizing performance-type specifications furnished by the weapon system contractor* and approved by the Air Force. (italics are ours to point up the key difference from Category 1.) These items will be furnished to the weapon system contractor for inclusion in his weapon system or to Air Force commands for use on or with weapon systems.

Category 3 (GFAE)—by contract between subsystem, equipment, or component manufacturers and the Air Force, utilizing specifications prepared or approved by the Air Force. These items will be furnished to the weapon system contractor.

Category 4 (Issue Items)—by contract between subsystem, equipment or component manufacturers and the Air Force utilizing specifications prepared or approved by Air Force. These will be furnished to Air Force commands.

The Surveys

Generally speaking, Air Materiel Command uses three types in its buying job, only one of which is directly concerned with contractor selection under the weapon system management concept. A survey of the surveys:

1—Pre-award or special source survey. Survey is done prior to letting a contract, in special areas the FCRs do not ordinarily cover. (Facility Capability Reports, or FCRs, are the normal way to handle the great bulk of AF procurement, are written by people in the field. AF feels FCRs are, as a rule, a pretty good breakdown on most potential suppliers. Its chief gripe: Congress picks up and clobbers it with the exception resulting from an occasional mistake.)

Examples: GE recently came up with a milling technique which it said, cut the cost to $3 for jet engine compressor blades. (They had previously ranged anywhere from $6 to $40 each.) Reason for the survey: GE was claiming something other manufacturers said couldn't be done: there are 1,000 of these blades in a J-85 engine and the Air Force buys about 300 engines a month. Survey result: GE was right and the Air Force was not buying a pig in a poke.

2—Industrial survey. A post (contract) award effort which may result from cost over-runs, schedule slippages. Team job: find out what is creating the problems, recommend solutions.

Team consists of people from such areas as management, engineering, quality control, cost analysis,—exact texture depending on survey requirements. Although team size runs from a minimum of about four to as high as 30 people, latter is an exception. AMC tries to hold team size to from 12-15 persons, feeling this is "ideal for survey of a major contractor." Team can easily end up looking at all aspects of a contractor's operation, i.e. management structure, in-plant and subcontractor control, corporate structure, master planning and program control, manpower utilization, all phases of engineering, production, project and contract administration.

3—Source Selection Survey. This is the one concerned with weapon system operations, is undertaken during prime contractor selection and, with variations, when his subcontract structure is up for AF approval. "Triple S" teams rarely visit plants unless AF knowledge of contender is limited.

Survey technique and services are available to other commands in the Air Force, have been used in picking uniform manufacturer for the Air Academy, etc., are now giving help to a three-man staff at the National Aeronautics and Space Administration where knowledge of such things is limited.

HOW THE F-108 WSPO IS ORGANIZED
The ARDC Side
The AMC Side
WSPO Chief
Deputy Chief
Clerical
Plans and Spl. Projects
Missile Group
Electronics
Aeronautics
Mechanical
Electronic Group
Fire Control
Mission & Traffic Control
Air Vehicle Group
Airframe
Human Factors
Flight Control
Structures
Support Group
Flight Test
Ground Support
Training Equipment
Power Group
Engine
Secondary Power
Training & Grnd. Support
Flight Test
Using Command Liaison
Clerical Staff
Production
Specifications / Tech Data; Flight Test Programs; Advance Material & Process Development; Training Devices & Personnel; Ground Support Equip.; Environmental Control; Missile; Production Resources; Airborne Targets; Fire Control System; Propulsion System; Mission/Traffic Control Sys.; Production status and Reporting.
Supply
Master program (maint. portion); Hi-Valu/Lo-Valu Participation; Spares Requirements; AOCP/ANFG; ECP (supply impact); Logistic concepts & plans (supply portion); Test support tables.
Maintenance
Master program (maint. portion); ECP (maint. impact); Logistic concepts & plans (maint. portion); Form 1300 review; Maintenance support (test program).
Contracts
Monetary forecasting & expenditure control; Evaluation of bids & award of contracts; supplemental agreements & change orders; contractual reports; Bailment/loan; Legal considerations; cost analysis.
Integration
AFR 5-47 documentation; weapon system programming; Milestone reporting; WSPG/EMG activities; Phase charts; Program analysis & evaluation; Deficiencies & impact; electronic environment (SAGE); Air installation Requirements; Qualitative personnel Requirements.

2—Setting up Subcontracts

At this point, the process begins to fan out. The prime or primes are asked to submit specific subcontract structures for approval, for all subsystem programs that exceed $20 million each. Picking firms for sub-systems costing less than $20 million is left up to the Air Force Plant Representative (AFPR) at the prime's plant to approve.

A subcontract review panel for these contracts over $20 million (made up of key people at AMC's aeronautical systems center concerned with sub selection) evaluates company reliability, facilities, past experience with the firm (all the normal business criteria) as well as technical know-how—in essence what the AF did in picking the prime.

Although WSPO reviews subcontract structure before prime selection is made, a Subcontract Advisory Panel was set up to nail down specific subs in post prime award. It is not a permanent body, there is a new one set up for each new weapon system. There were several reasons for the panel. The minor ones:

1—Aeronautical Systems Center (the procurement branch of AMC headquarters) wanted to prove people in Dayton were qualified, did not want review farmed all the way into the Pentagon.

2—The panel would provide a broader base of knowledge than WSPO, by itself, could assemble.

The major one:

On the F-108 and B-70, the Air Force was getting the prime contractor into areas where he had really not done much procurement before. To protect the government, insure that the prime had done an unbiased evaluation and had run a fair contest to pick the best source, ASC felt it needed to go to a formal procedure in reviewing subcontract structure.

In setting up the panel, it provided North American with information on who were the leaders in state of the art so he would stick here, also make sure he took advantage of Air Force technical developments.

So far technical evaluation has not been the prime reason for a change request. The AF is relying on NA technical capability to insure subs don't come up with some bad design. AFPR has authority for technical evaluation and accompanies contractor to the panel when AFPR is satisfied the contractor has done a proper selection and evaluation job on a technical basis. Panel looks at the more substantive aspects of proposal, sits in a position of concurring with the structure. If panel does not agree, contractor finds another source—but panelists must

have a good reason for disagreeing. Without one, contractor has enough authority, under the concept, to make his proposal stick.

Weapon System Project Office

The WSPO (pronounced Whis-Po) is the focal point for all phases of the life cycle of a weapon system and is set up prior to the selection of the prime contractor. Although ASC has set up WSPO for all major Air Force weapon systems and they all are organized pretty much alike, two (those for the F-108 interceptor and the B-70 chemical bomber) can give the best picture of how the WSPO fits into the concept from start to finish. Others were adapted to the weapon system concept, or created for some weapons already near the end of their life cycle (when the WSPO job is nearly completed), others were well into production, and most were well into advanced development.

Since all WSPOs are pretty much alike organizationally, varying only as the uniqueness of the weapon system itself varies, an analysis of the F-108 WSPO will give a fairly clear idea of the larger-size problems and procedures.

General operational requirements for a given weapon system are set by the Air Staff. The WSPO is executive manager for the weapon, sees that the requirements are met and the system developed according to a pre-set time schedule. This is not quite as simple as it might sound.

The F-108 WSPO, as AF nerve center for their particular weapon system, became embroiled in F-108 problems almost before the office door was open.

USAF had picked North American the prime, awarded the propulsion system to General Electric. They also told North American to subcontract to Hughes aircraft for the fire control system and the GAR-9 (an advanced, longer and larger, Falcon) missile—a move they do not like to make ordinarily because it limits the prime's freedom.

It was not an arbitrary decision, however, but resulted from the F-108 WSPO team's evaluation of all known fire control systems (ARDC lab people did the technical evaluation, ASC handled the business aspects). In essence, they did the prime's job for him.

The WSPO then sent a letter to North American and Hughes setting policy on how they would do the subcontracting. (AF retained the right to veto primes' choices, however—a move no longer necessary now that the new make-or-buy policy will become a part of all contracts.) After WSPO was moving fairly well, it set nine critical systems (missile, fire control system, secondary power, environmental control system, et al) on which they wanted to approve specifications prime would send out for bid. (On the B-70 there are 5 such critical systems.)

Reason: they wanted to make sure AF needs were being considered in the specs. They also listed landing gear, missile propulsion, air induction control and some others, non-critical, which the AF wanted to check anyway. On these however, the AFPR was allowed to make the determination.

As noted before, since the WSPO was now North American's contact with the Air Force, it was the WSPO which took NA's subcontract structure to the subcontract review panel, on which it has one vote, for approval.

Prime (North American, in this case) prepared a master schedule (so detailed it even recommends the type of base installations, etc. needed for the weapon) based on the Air Force target date. Program Progress reports are set up at the WSPO, at the Prime, among all the subcontractors, are updated each month to keep all elements aware of progress.

The WSPO job: integrate the total AF weapon system program, administer the AF contract, maintain technical and production surveillance over the weapon system contract, fund and coordinate all subsystems and GFE to fit into the overall operational system at planned target date, phase AF testers into picture at the proper time.

AF Stays Out

Here again, when actual work begins, just as in setting up the subcontract structure, the Air Force, to make its challenge stick, must stay out of the picture as much as possible. WSPO men say Contractor Developed Material procedures have been a lifesaver here. CDM procedures mean the WSPO lists certain material and equipment needing their approval to change. On the others, contractor may make his own decision, just provides AF with data on what he has done.

Although staffed by both ASC and ARDC, executive control of the WSPO itself starts under ARDC. It shifts, however, to ASC when the AF starts buying for inventory.

In essence, on the F-108, the Air Defense Command wrote the "How-we-will-use-it" plan, ARDC will develop it, the AMC Air Materiel Areas must program to back it up and the WSPO will see that the program stays in balance and on schedule.

What are the Problems?

The weapon system concept, although several years building, really jumped into public view only last year. It is still nagged by criticism. Unfortunately, the bulk of the harping is unjustified. The only real experts on the operation are a comparative handful of men in AMC and a few big companies (chiefly North American and Convair). Here is a concensus of their answers to the most asked questions:

What does industry think of it?

Contrary to what some headlines might make you think, there have been few complaints. The mark of industry acceptance, is that they are copying the system. Of course, they are adopting it because it is becoming more and more the Air Force way of doing business. There is a feeling in the military that U.S. industry has enough integrity, that it would fight the idea if it thought it was bad.

Does the Air Force believe this is the ultimate?

"The WSPO, across the board, is not a final set up but only a beginning." The immediate problem is to replace the Corps concept which exists today, even in the Air Force. The idea is to make the weapon system the hub of the wheel and funnel support efforts into it—not, as in the Corps concept, tear the weapon apart and assign an element here and there, to be reassembled later. In other words, make the weapons, and not the organizational elements which support them, the focal point of operations. **Air Materiel Areas complain they are given the program when they can no longer do anything about the decisions. Why aren't they delegated the responsibility?**

Air Force can't, in the present stage of WSPO evolution, become too decentralized. The technical capability required, and available, at command headquarters, is lacking in the field.

Weapon schedules are still missed. How come?

Reason a WSPO fails in a schedule, more often than not, is that it has to be tailored to fit Defense Department policy and programs (and from them the funding). Most of the time when a WSPO is clobbered, it was not their fault.

Why review subcontract structure twice—once before prime award is made, once after?

To be as sure as possible of an objective company evaluation for one thing. Also, Air Force doesn't intend for prime to marry himself to subs in presenting initial management plan, wants him to shake down possible subcontractor's advantages as much as possible, even after prime award is made. Of course, they talk in terms of subs in the first go-round, and some companies identify themselves with subs more than others—but the prime is not committed to these once he's picked. (Some primes don't even want subs on their final proposal announced until prime has a firm contract. They want to keep the bargaining position open to get possibly a better one.)

Why review only programs over $20 million?

Air Force picked the figure on a trial basis, will probably adjust it as they gain more experience. The objective, whatever the figure: give subcontractors greatest possible freedom but still allow the Air Force control of the overall program they think they need.

Has AF ever contracted for a major weapon system entirely under category I?

No, for technical reasons. For instance, conventional engines and jets are still GFAE because engine development is almost as great a problem as developing the weapon itself. It's conceivable, when science gets further into solid propellants, etc., where propulsion is an integral part of the air frame, that this will change.

Why does the AF usually "suggest" rather than require that prime make changes from time to time?

Under this new buying concept, the Air Force is, in effect, hiring the prime to perform total technical integration and procurement of most of the equipment and facilities he needs. AF is reluctant to order a change in his structure because it amounts to delegating responsibility, withholding authority, gives the prime a chance to blame the Air Force if the program flops.

Where does the new make-or-buy policy, published in January, fit in all this?

Make-or-buy policy will become part of every contract, mean subcontract structure will have to be negotiated. Although it has worked well so far, review procedure was little more than an informal agreement until now. Technically, only written control AF has had on what prime did was in use of government facilities.

Then too, Air Force is trying to push the responsibility for backing small business down to the major subcontractor level where it belongs—by making the small business aspects a written part of the contract rather than the promotion campaign it has been in the past.

There is another big reason. Air Force doesn't want the prime to build new industry in his own shop when it already exists elsewhere—for the very simple and selfish reason that it slows up delivery, tends to produce inferior results.

Isn't the WSPO a sort of two-headed monster?

Not to the 40 or 50 people (adding up both sides of the fence) in the F-108 WSPO. Even though ARDC people run the show during development, ASC cohorts sign off on all the papers. In effect, at the working level, command identity tends to be lost and they work as a team.

How does the WSPO decide when to stop developing and go into production?

Actually they don't. The Air Staff does. Long-lead-time items (as much as two years) often mean a gambling decision must be made, i.e. "Should we buy production when we are still virtually in the R&D phase?" WSPO tells the Air Staff: "Production now means this weapon; waiting three months may mean this (better) weapon. Shall we wait or not?" Technical problems sometimes make the decisions, but funding is the usual criteria by which the Air Staff decides, i.e. "can we keep the program moving that extra three months?"

How do Air Materiel Areas phase into the picture?

Maintenance and Supply offices in the WSPO ask during development, ("Are they building something we can maintain?"), keep the AMAs informed so they can make plans and programs now, not start two years later when the weapon is dropped in their laps.

What will this concept mean to industry?

A great many things. It has already changed entire management structures, particularly among the primes. But it is not just a new, different way of buying weapons. It is a requirement for successful progress in new Air Force weapon development dictated by the changing nature of weapons and aircraft. Industries that have recognized the change are reaping harvests. Those that haven't, or won't, are complaining to Congress and/or dying on the vine.

Increased firepower, greater performance characteristics mean the Air Force does not need as many different kinds of weapons, in quantity, as it once did. The B-52 will probably be the last "big production" item representing major dollar investment (in some 600 aircraft). So there are fewer contracts let. This is making the market tighter in spite of rising military budget. Big companies that once would not think of it are now going after subcontract business because it still represents a large chunk of dollars.

What do primes look at in evaluating subcontractors?

The most successful ones check out pretty much the same things AMC's Aeronautical Systems Center does. Industry is getting deeply into the source selection procedure itself, now looking much more closely at sub's cost structure, capability, management know-how. The result is that businesses which are still in the market in a big way are baking the fat out of their operation and becoming more competitive. The ones that aren't, and there are some surprisingly big ones, are labelling this whole process something else: "Freezing out the competition."

How good an evaluation job are the primes doing?

North American, with the most experience in this field, is probably the best example. As with the Air Force, North American has done everything possible to cut down the subjective influence in evaluation. On the F-108, for instance, even after they carefully prepared uniform space, NA still had to send men out into the field to get new data because of the incompleteness of sub's proposals—to "make sure they were comparing apples to apples." Survey teams traveled over half a million miles, visited plants in 90 cities throughout the country.

Why all this emphasis on evaluation?

To quote the Air Force, "There just isn't time to put up with hard-headed reluctance to maximize use of state-of-the-art knowledge, particularly in the subs. We haven't the time or the money to invest in a technical build-up. The surest way for a company to cut its own throat in our market is underbid to get a contract, then overspend later building the capability."

And from North American, "The success of the B-70 and F-108 weapon systems will depend to a large degree upon the capability and performance of the firms that are awarded responsibility for development of major systems. Therefore it is essential to us that the best qualified organizations be encouraged to compete for this business and that our evaluation of design proposals and related capabilities be as thorough and objective as we can make it."

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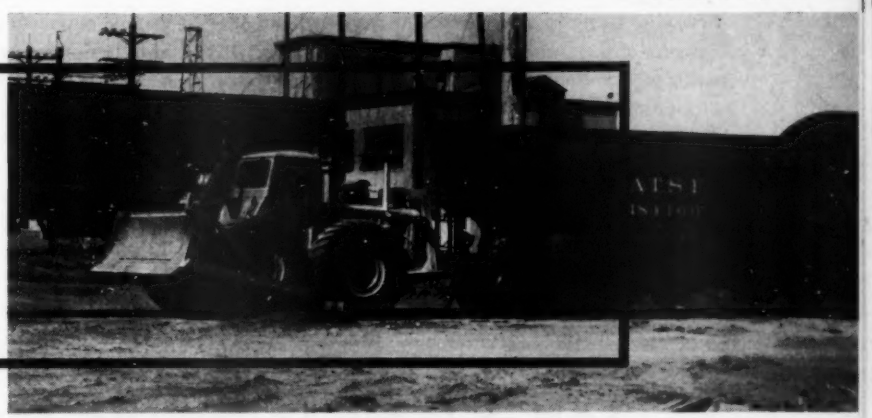

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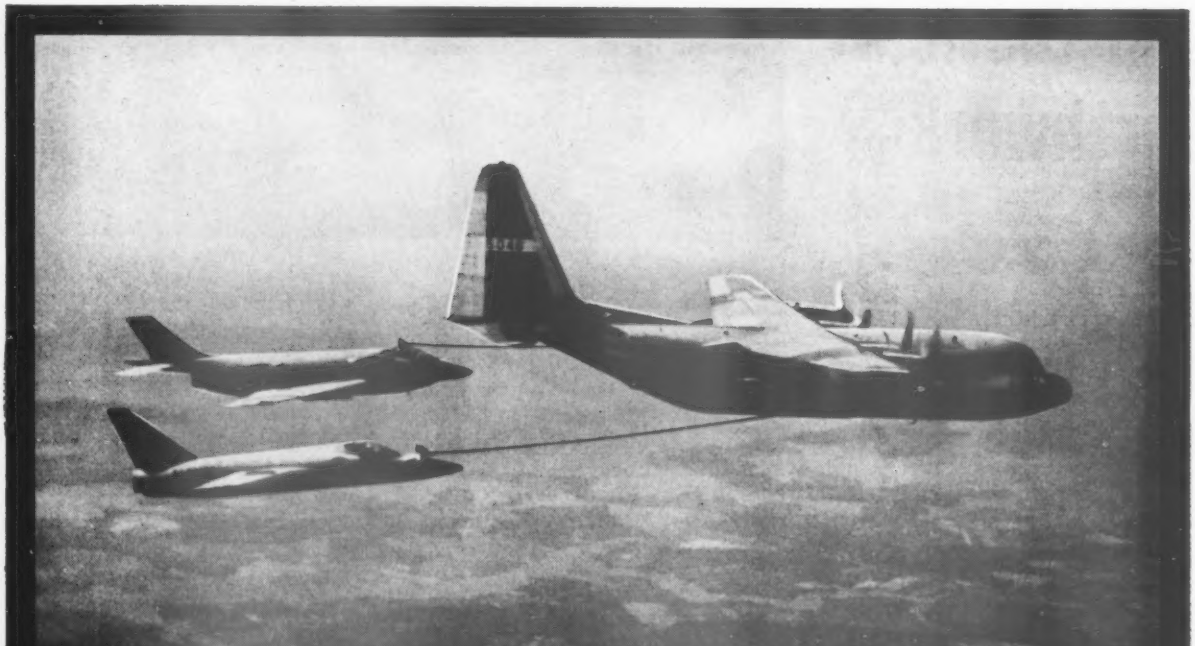

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Who Needs Value Engineering?

Originally developed by General Electric, the idea of "Value Engineering" was adopted by the Navy's Bureau of Ships in 1954 to help hold down skyrocketing shipbuilding costs, saved them over $18 million in its first year. Although soundness of the technique has been proved, other military agencies have been slow to pick it up which is why Value Engineering can still be classed as a dynamic new program.

by Captain Richard Mandelkorn, USN

VALUE engineering is more than just a tool, it is a dynamic concept to improve the economy of design, contruction and maintenance. Like any tool it must be properly understood and properly used. This discussion will be limited to Value Engineering in the Navy's Bureau of Ships and its Field Activities since to the writer's knowledge no effort comparable in scope is being prosecuted by any other bureau of the Navy or by any other government agency.

The first question, of course, is "Why do we have value engineering?" In 1954 the Chief of the Bureau of Ships was impelled to review the current industrial approaches to the problem of cost reduction, in an effort to stem the tide of increasing shipbuilding costs. The cost of building new units of our Fleet was rising so rapidly that we would son price ourselves out of proper defense build-up. Roughly, a conventional submarine which cost $4 million in 1933 was priced at $23 million in 1953; a destroyer which cost $3.6 million in 1933 had risen to $31.7 million in 1953.

It can be argued that some considerable portion of this increased cost was directly attributable to the enhanced fighting power of warships and their resulting increased size and complexity. The advent of the complicated new weaponry, including guided missiles and atomic weapons of many types, and the rapid development of faster, heavier jet aircraft have undeniably engendered concomitant increases in ship size, weight, and cost. The fantastic growth of electronics requirements to keep pace with developments in communications, weapons control, target identification, and navigation is reflected in a similar increase in dollar cost. And undeniably the continuing rise in labor and material costs have been significant contributory factors in the development of this situation. However, when these factors are identified and removed, there is still a residue which apparently represents cost for value not received.

In what areas was the Navy not receiving its money's worth, and how could economies be brought about?

As a result of his inquiry, the Chief of the Bureau, early in 1955, established an office in the Bureau of Ships reporting directly to the Chief. Its mission was to investigate and develop an effective cost reduction program along the lines of the value analysis efforts which had been successfully underway in industry for several years. The initial Value Engineering Office consisted of one captain (ED) USN and four senior civilian engineers, soon augmented to five. The engineers selected for this first effort were specialists in: naval architecture, marine engineering, mechanical engineering, electrical and electronic engineering. Each engineer, however, had a wealth of practical experience and had demonstrated executive ability as well as wide background in fields outside of his own specialty.

The first step in drawing up the program was made through visits to a number of strong industrial establishments including manufacturers of marine engineering equipment and machinery, diesel engines, air conditioning and refrigerating machinery, electronics equipment, farm machinery, and others. By so doing the Value Engineering Group hoped to combine the best of available industry techniques and mold them into the Bureau's program. They wanted to avoid the avenues of development which industry had found to be unprofitable.

By the time these visits were concluded and the results digested, a pattern for operation had begun to emerge. First, to identify the Bureau's effort and differentiate it from previous programs, it was decided to term it "Value Engineering." This name signifies the major target, that is, to get value in the products which we engineer in the Bureau of Ships.

What is Value Engineering

This leads then to a definition of value engineering.

Essentially, value engineering is a concerted effort to get the required function at the minimum cost. Both of these elements are important. It is fundamental that the required functions must not be compromised. It is also fundamental that they be purchased for the minimum price.

Value engineering has as its aim the development of a specific product which performs the required function at minimum cost and with no impairment of performance or reliability. It is frequently more effective to value engineer a product already in existence, rather than a design which has never been constructed. However, as will be seen later, the value engineering approach—this concept—this way of doing business can be employed effectively on original design.

This whole effort is predicated on certain strong tenets. First, give the customer his money's worth; second,

give the customer what he asks for but no more; and third, spend every dollar as if it were your own. To elaborate on these briefly:

First, give the customer his money's worth. In the case of the Bureau of Ships, the customer is the Chief of Naval Operations. The shipbuilding and ship maintenance programs which the Bureau carries out are those directed by the Chief of Naval Operations. By giving him his money's worth there results the strongest, largest Navy for the money expended. If three equally effective fighting ships can be built for the price of two, the country's gain is significant.

Second, give the customer what he wants but no more. This might also be phrased "Meet the specifications but don't exceed them." The design engineer and the production man are always confronted with the temptation to add a little extra, with the subconscious reasoning that "The best is none too good for our boys" or "Remember, human life is at stake." This can and does lead to expensive design, including redundant strength in structure and unnecessary frills and trim.

Third, spend every dollar as if it were your own. This is self-evident since we are all tax-payers. But how many designers and engineers are aware today of the dollar cost of the design they are preparing or the engineering details supporting that design?

Very well then, if we agree upon these high-sounding principles as being common-sense, how can we place them in operation? It was decided that the logical approach was to make some prototype value engineering studies. These would determine several points: the scope of value engineering; the effectiveness of its techniques; and the potential value of Value Engineering measured by actual dollar savings. A number of studies were undertaken, one of which provides an interesting example:

The LCVP (Landing Craft Vehicle Personnel) is a 36-foot boat of early World War II design. This boat is used to haul cargo of either small vehicle (jeep) size or approximately 20 people from ship to shore and land them safely.

Specific Proposals

Analysis of this LCVP design by value engineering techniques resulted in twenty-five specific proposals for dollar-saving changes which would not reduce the performance of the boat. Of these, nineteen were accepted, and the other six considered for further study. The nineteen proposals adopted included:

(1) Cease procurement of boat slings with each boat. Users requiring them could draw them from stock.

(2) Substitute impregnated fir plywood for marine mahogany plywood.

(3) Redesign the fuel tanks. Use standard cylindrical medium steel drums instead of special-shaped welded copper-nickel alloy tanks.

(4) Eliminate certain NWT bulkheads and dummy hatches.

(5) Simplify the electrical system and some of its components. Each backed up by specific and detailed proposals and relative cost studies.

What happened to the cost of these boats? Since 1942 the Navy had procured 24,000 of them. As a result of specification changes derived from the value engineering proposals, the contracts were placed at $3,000 less per boat than was budgeted on past experience, for a total saving of $3-million on this procurement.

But this is not the end of the story. The Bureau's designers and engineers have gone ahead with these and similar ideas to apply them to the other boats in the Bureau's family, to effect a value-engineering redesign of all the boats we procure. So the first $3 millions saved was just a beginning.

This study, and several others carried on concurrently, gave valuable experience and provided confidence in the success of the value-engineering approach and an appreciation of its comprehensive potential scope. It proved that responsible engineers did not consider specifications sacred when sufficient facts were brought to bear on the justification for changes.

Among the lessons learned which were put to good use in expanding the

Value Engineering holds down costs of such ultra-complex ships as this carrier. The aim is more defense for fewer dollars.

In Brief:

In simplest terms, value engineering means applying science to the art of getting your money's worth.

The Rules

The engineer in search of value predicates his entire effort on three rules—

1—Give the customer his money's worth
2—Give the customer what he asks for but no more
3—Spend every dollar as if it were your own

In the course of developing the value engineering concept, certain methodology has been developed. The methods have been given names. Some are techniques and some are philosophical attitudes.

The Techniques

THE JOB PLAN. All jobs can be broken down into a series of simple steps. Any job can be done better by a planned program, one step at a time. The plan includes an evaluation of expected obstacles.

GET THE FACTS. In many cases decisions must be made on the basis of opinion because all of the facts are not available. One has to be realistic, get all of the facts and accept the story which these facts tell.

USE BEST SOURCES. Get all information from the best source. Don't rely on the normal or the usual source, look for the best source.

USE SPECIALISTS. Use specialists both in government and in industry. Keep track of who knows what. Don't

program: First, to make savings it is essential that one be able to recognize weak points in design or construction details. Before an unduly expensive procedure can be corrected, it must be ackowledged. There is no best way to do the job the first time. Upon what basis can one judge that it is the best way?

It was also evident that large savings result more rapidly from economies on items used in quantity. Here, pennies saved per item result in total savings in thousands of dollars. Any naval vessel represents a huge mass production opportunity. There are miles of electric cabling, thousands of feet of piping, tens of thousands of pipe and cable hangars, thousands of feet of welding, a multitude of valves, a myriad of electrical switches, distribution boxes, stuffing tubes, and other fittings. From this it follows that a system requiring extensive installation techniques such as wiring or piping are open to the value engineering attack. A good example is the new cable strapping method for installing electrical cable aboard ship.

This project was all ready for application when value engineering began operations at one of our Naval Shipyards. For many years the Navy had been using custom-formed metal bands to hold electric cables in place. These were expensive because each group of cables required a special band, tailormade to suit. Someone had observed the way in which steel straps or bands are used to seal cartons for shipment. Couldn't these straps be used to hold electric cables? They tried it. It worked. The value engineering unit helped by getting the costs and assisting in standardizing the hangars and tooling. Their figures showed that using the new strap would save about 50 percent of the cost of securing electric cable. This means about $200,000 saved on a large aircraft carrier conversion.

The value engineering unit did not originate cable strapping by the new method. Value engineering has definitely accelerated adoption of this idea by the other naval shipyards not only on new construction but also on repair and maintenance work. Then the value engineers went one step further. If these straps could hold electric cables in place, couldn't they also be used to hold pipes on certain ventilation ducts, etc.? These possibilities are now under study.

Where to Apply It

Value engineering, it was found, could save basic materials, components, equipments, systems, boats, and craft. It follows automatically that large dollar savings can be affected on ships.

A project, initiated at one of our Naval Shipyards, involved the saving of $140,000 on an aircraft carrier. The saving is largely centered in the way in which the gasoline pipe guard is fabricated and installed. There are about 450 three-foot sections per ship. Each section of the new guard requires only two passes to be formed compared to the many passes which were required to shape the old guard. The tolerances on fitting the section in place are easier to meet. The method of fastenings is simple and cheaper. Incidentally, each section of the new guard is hinged for easier maintenance of the gasoline pipe underneath.

An interesting recent value-engineering proposal has to do with a familiar item—dogs for watertight doors, which are used by the thousands. Each watertight door dog has a steel shaft which is fitted with two bronze bushings, customarily machined out of bar stock, is an operation sometimes called "making chips." Each dog shaft is drilled and machined to permit periodic lubrication, and a lubrication fitting is provided.

Recently a value-engineer looked into this situation, and found that an impregnated bronze bushing of proper size was available commercially on the shelf, as a catalog item. It is self-lubricated for its life, and therefore not subject to the vagaries of periodic maintenance. There has been sufficient experience with such bushings in many applications to prove their dependability for the proposed service. As to

(*Continued page* 26)

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try to duplicate the knowledge but use it when it can give better value.

CREATIVE THINKING. Turn off the judicial part of the mind on occasion and practice using creative abilities. They will grow with use and new ideas will then be available to choose from.

WORK ON SPECIFICS. Single out certain specific pieces of hardware to work on. Work on these pieces of hardware systematically, one at a time. Avoid generalities, and avoid work-improvement programs as such. These are being handled by the management engineers.

USE A DOLLAR SIGN. Evaluate in terms of dollars. Put a dollar sign on ideas. Work on those ideas where the greatest savings can be made. Mine the richest lodes first.

EVALUATE THE FUNCTION. Divide the product into functional areas. Relate the cost of each function to the value received. Think functionally and ask the five basic questions.

EVALUATE BY COMPARISON. We have asked what does it cost. Now ask what is it worth—by comparing the way the function is performed in this case to other ways of doing it. The only way to know whether one has value is by comparing costs. Be sure to compare things which perform the same function.

BLAST, THEN REFINE. These are really two steps. If we "blast," that is, set out to eliminate 90 percent of the cost, we will be forced into previously unexplored areas. Then refine, that is, add on those refinements needed to restore the original quality. The net saving will run over 50 percent rather than only 5 percent.

USE STANDARDS. Standards are set up to save money. Design around standard details. Use a special part only when there is a demanding special function. Remember—there are all kinds of standards.

USE YOUR OWN JUDGMENT. If you don't think it's right, it probably isn't. Do something about it because if you don't change it, it will stay the way it is.

DON'T BE A HERMIT. A hermit is someone who retires from society and attempts to live in solitude. We must deal with people so keep the lines of communication open between ourselves and outside sources.

GOOD HUMAN RELATIONS. We must set the highest standards for ourselves, and be willing to accept less than perfection from others. A good critic once said "It is human nature to resist change and resent criticism."

OVERCOME ROAD BLOCKS. Don't be stopped by illusory shadows. If a real road block arises, define it clearly and then set out to overcome it.

REMEMBER WHO PAYS THE BILL. Every time you spend the government's money, remember that it comes from taxpayers. This includes you and me, so spend the government's money as if it were your own because it is.

These are a few of the building blocks, which taken together, form the skeleton of value engineering. The use of these techniques by a group in a staff capacity on a full-time basis can go a long way toward getting value.

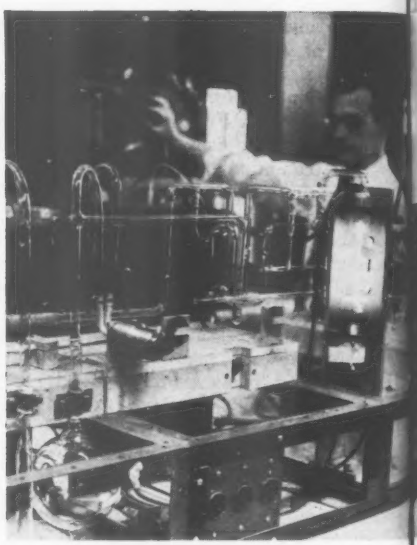
CAPABILITIES FOR DEFENSE

Westinghouse is spending $185 million for research and development in 1959

HERE ARE SOME CURRENT PROJECTS...

HIGH TEMPERATURE ELECTRICAL INSULATION. Effective for long periods at 500° C—eventual applications to 1000° C now contemplated. Demonstration motor shown above is running red hot. *Aircraft Equipment Department, Materials Engineering Departments, and Research Laboratories*

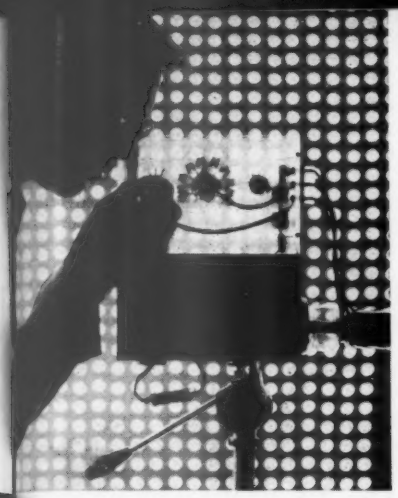
SPECIAL METALS. Westinghouse spearheads research in refractory alloys with one of the country's largest programs in special metals. Westinghouse is nation's principal supplier of a number of special defense-application metals. *Materials Manufacturing Department, Aviation Gas Turbine Division and Lamp Division*



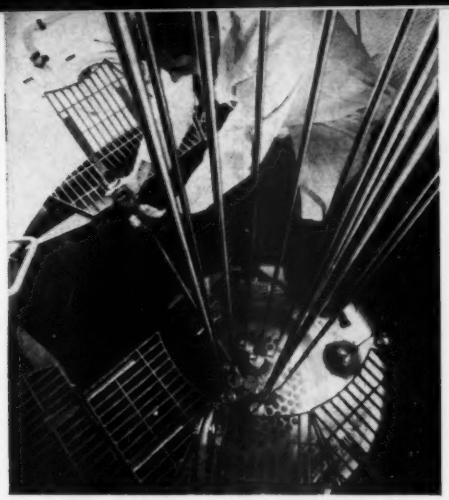
HIGH-VACUUM RESEARCH. Extensive high-vacuum research conducted since 1947. Current areas of investigation include electrical and chemical pumping in ultra high-vacuum range and component development for large high speed pumping systems. Results being applied in advanced electronic device development. *Air Arm Division and Research Laboratories*

UNDERWATER SONICS. Current Westinghouse projects being conducted in laboratories and at sea are investigating various types of "scatterers" and their effect on the underwater transmission of sound. Also under development: acoustical torpedo controls and an acoustical mine identification system. *Ordnance Department and Research Laboratories*

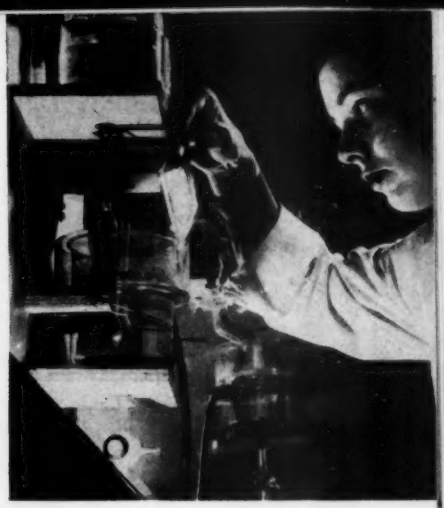
NON-ROTATING 360° RADAR ANTENNA. Only the feed point moves. Principle involved will permit economical construction of very large high gain scanning antennas. Application of inflation techniques will permit lighter-weight long-range air-transportable radar. Working models already built and evaluated. *Electronics Division and Research Laboratories*



LIGHT AMPLIFICATION, through electron bombardment induced conductivity. Extremely sensitive. Principle especially useful for satellite reconnaissance devices. Efficient working models have been developed. ***Electronic Tube Division, Astronautics Institute and Research Laboratories***

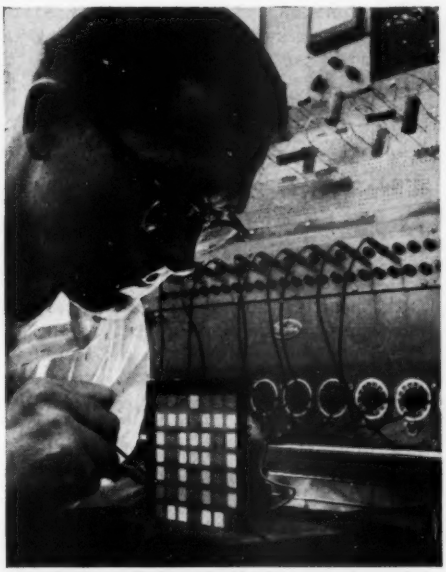


NUCLEAR RESEARCH. At the Westinghouse Testing Reactor, engineers are preparing high intensity radiation tests on a wide range of materials to determine their structural, chemical, and nuclear stability. This is a necessary prelude to using these materials in certain atomic power applications now under development. ***Atomic Power Department***

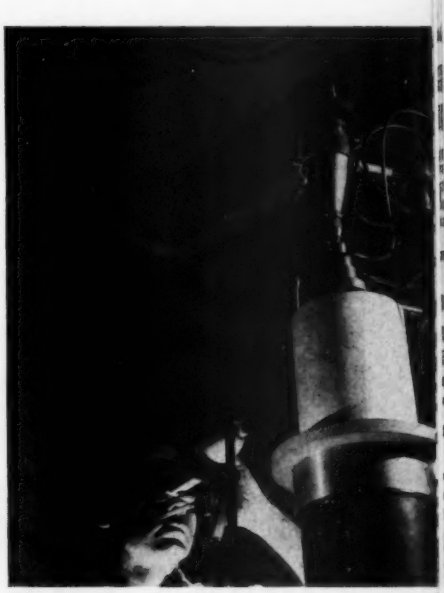


INFRARED research projects include: *thermal imaging* — working models in advanced development; *ultrasensitive doped crystal detectors* — advanced test models; *photo-electric magnetic detection* — working model. ***Air Arm Division, Semi-Conductor Department, Materials Engineering Departments, and Research Laboratories***

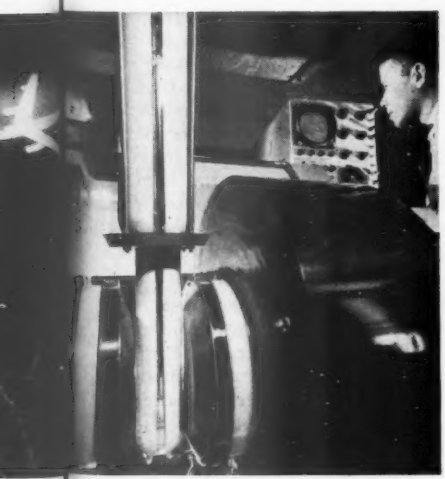
PULSE-DOPPLER RADAR is in advanced development in three major areas of application at Westinghouse. Research is continuing to open up new potentials. Westinghouse is the acknowledged leader in this field. ***Air Arm Division***



NEW DATA DISPLAY DEVICES. Electroluminescent cells, individually controlled, form flat picture. Model has oversize cells for demonstration; latest techniques produce cells only 1/16" across. Similar tote board display, capable of high-speed read-out of digital inputs, in production. Both devices can be erased instantly or retained and studied for long periods. ***Electronics Division, Rayescent Lamp Department and Research Laboratories***



THERMOELECTRICITY. Westinghouse recently developed the first efficient material to produce electricity directly from heat at high temperatures (1100° C). In addition, other thermoelectric material under development can be used for cooling purposes, including very light-weight applications. Forty Westinghouse scientists now on this project. ***Materials Engineering Department and Research Laboratories***



LOW-NOISE MICROWAVE AMPLIFICATION. Westinghouse scientists have developed various low-noise solid-state amplifying devices, both MASER and non-linear reactance types. Progress in recent years was speeded by prior years of research in low-temperature and solid-state physics. ***Air Arm Division and Research Laboratories***

For information on these and other research projects, write to Mr. E. W. Locke, Director, Customer Relations, Westinghouse Defense Products Group, 1000 Connecticut Avenue, N.W., Washington 6, D. C.

Westinghouse

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cost, the old machined bushing costs the Navy $1.10. The proposed one can be purchased for 10 cents.

What are the methods for applying value engineering? Today, they are focused on five basic questions which can be asked about any product. In examining the answers to these questions, the techniques of the value engineer can be made evident. They are:

1. What is it? In other words what are the design specifications for the item? What do the drawings call for? Does it exceed them in any way? Are there close tolerances prescribed and are they really necessary? (There have been instances of instrument boxes being built to .001" tolerances; of aluminum cabinets being replaced by corrosion resistant steel in the interests of eliminating magnetic materials; etc.)

2. What does it do? Or on the other hand, what is it supposed to do? What is its function? Do the performance specifications fit the job? Is the function a necessary one? (Were high-shock circuit breakers really needed on an LCVP lighting and horn circuit?).

3. What does it cost? One cannot reduce cost without a starting point. Accurate and reliable costs are the essential base for a Value Engineering study.

4. What else would do the job? This is the heart of the problem. How does one approach the development of an alternative for an existing item? Here is where an open mind, a willingness to think differently, and a readiness to adapt change pay off handsomely. The approaches used in this area spell the difference between victory and defeat.

5. What does it cost? This requires an accurate, completly-supported cost estimate for the money-saving alternative which is being proposed.

The Wrap-Up

Now suppose that an unduly expensive product has been carefully examined and a completely value engineered alternative is developed. What next? The next step is most necessary and its importance cannot be minimized. The completed study must be drawn up in such a way that it speaks for itself, with complete supporting information on the capability of the recommended product to perform the required function satisfactorily. Then, and only then, is it handed to the line engineer normally responsible for decisions on the item in question.

It is his decision and his alone to adopt the recommended change and effect the results in economy. No value engineer can relieve him of this responsibility, and therefore the credit for saving is also his. It is impossible to place too much emphasis on this point. The credit for making the saving must go to the responsible engineer, and if, for reasons of his own, he does not wish to take the recommended action, there should be no overt or covert pressure brought to bear on him.

To put it another way, there can be no policing activity associated with the value engineering operation, since it must depend upon the acceptance of the line engineer who is responsible or cognizant. Value engineering must be recognized as a service activity standing ready to assist the line engineer in any area where it can be of effective assistance.

Value engineering units are now in operation in all eleven naval shipyards. The majority of their successful studies have wide application and so they will serve as an increasingly fertile source to generate cost saving ideas of wide applicability. Their periodic reports to the headquarters Value Engineering Office of the Bureau of Ships, with copies to each other, serve to keep all personnel operating in the field of value engineering up to date. Furthermore, many extravagant procedures and designs which would be unlikely to come to the Bureau's attention otherwise are now being brought forward.

There is also now under active study a proposal to extend value engineering to the operations of shipbuilders holding Navy contracts so that the Navy can benefit from their ideas as well. It is likely, then, that in the early future shipbuilding contracts will include value-engineering clauses. Accordingly, the members of the society should have an early opportunity to become personally acquainted with this powerful new cost saving concept. That being the case, there should be commercial as well as Naval interest in how engineers are prepared to participate in this program. The seminar method, used to good effect in industry as well as in the Bureau of Ships, is worth examining in this regard.

To quote R. H. Fogler, then the Assistant Secretary of Navy (Material) in 1956, in presenting certificates of completion to the engineers trained in the last Value-Engineering seminar held in the Bureau of Ships: "This demonstration inspires me, I believe, almost more than anything I have experienced in my tour in the Navy. . . . These potential savings that you have suggested today are impressive."

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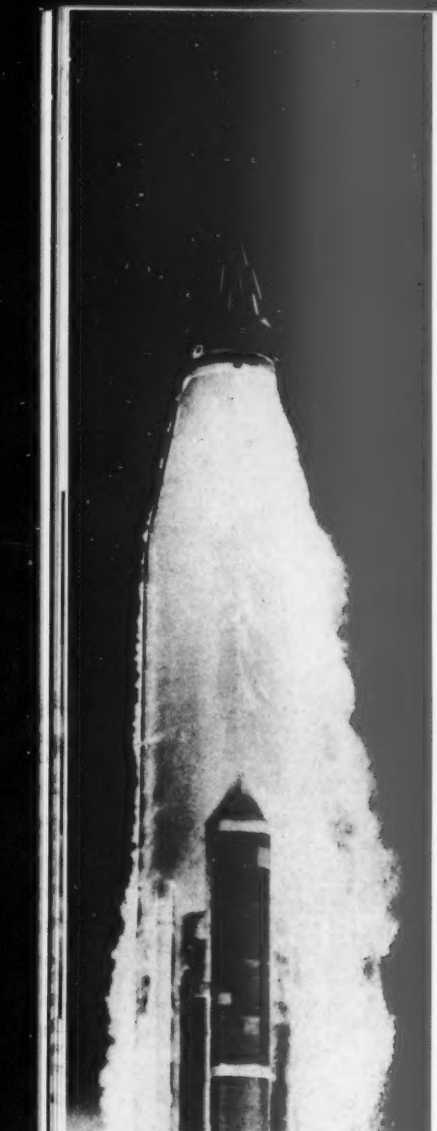
Fourth in a series on military-contractor relationships.

Industry R&D Meets a Dual Goal

Better defense and a reasonable profit are the two objectives of Industry Research and Development. Under the burden of growing responsibility, this is how the problem looks from the industry viewpoint . . .

by Dr. Irven Travis
Vice President,
Research and Engineering
Burroughs Corporation



Atlas computer system was designed by Burroughs—almost faster than the Air Force could keep up. Project underlined the need for inter-industry and military—industry coordination.

INTEGRATED weapons systems, earth satellites, atomic-powered submarines, high speed computers, among a myriad of specialized smaller hardware are the visible, spectacular, publicized achievements of the defense program.

Less visible, but perhaps even more important to our future security than today's weapons, is the harmony of effort necessary for military research and development which has been evolving in recent years between the Armed Forces and industrial management.

In fact, the interplay between meeting military needs in a responsive and responsible way on the one hand and, on the other hand, satisfying the demands on business to maintain profitable, aggressively competitive commercial leadership, is forging important changes in business organization—changes calculated to add speed and effectiveness to weapons design and procurement, while at the same time adding new power to the forward movement of our entire economy.

In the business world, there is general acceptance of the fact that a part of political *and* industrial planning must be concerned with maintaining a powerful military position.

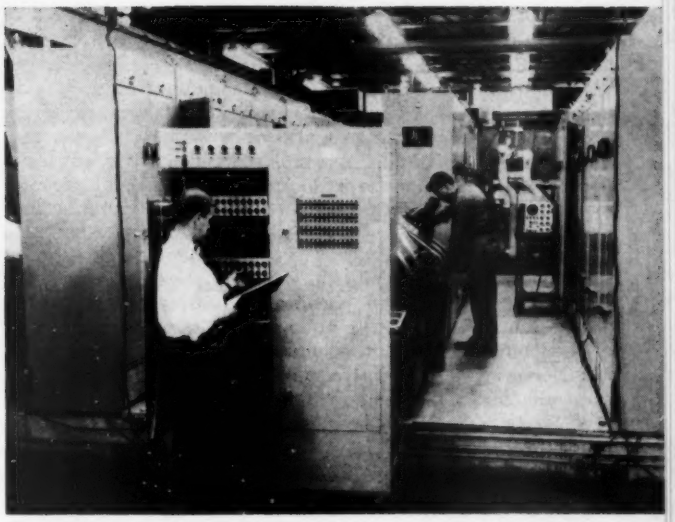
War and its demands, however, have always been transient phenomena in the history of American thought. We have geared our culture to peace and have built our productive machinery to satisfy a peacetime market. Industrial research, expansion of manufacturing facilities, and all of management's skill and experience always have operated and found their rationale in the framework of peace.

Commercial and industrial competition has been the motive force of the ordered cycle of new product development, production, obsolescence, and replacement. And it still is and will be. But a new kind of competition requiring faster and more radical responses now faces us. Industry planning must now include military needs set by the pressures of world political forces and intensified by major technological advances.

Admittedly, an adjustment has had to be made. It is clear, however, that vigorous participation in military research, development, and production can be wholly compatible with management's goal of running a growing profitable business.

This last point is worth some consideration for it involves far more than the simple consideration of a profit margin on a research contract or on an item manufactured

The author shows off a component from the Burroughs Electrographic Teletypewriter for Army (BETA).



Burroughs technicians carry on extensive components testing operations. This careful checking-out means better defense.

for the Armed Forces.

During the last war and in the years since, despite industry's magnificent response to scientific and technical emergencies, it has not always been clear that servicing the military would not fundamentally change the nature of any company. Wrangles over specifications, inspection (and rejection), secrecy, patent rights, obsolescence, costing methods, time schedules, as well as priorities affecting a company's commercial position and long-term leadership, all tended to cloud the ultimate issues and encourage management to cling to the hope that events would soon return to their "normal" peacetime relationship.

Mutual respect and understanding, however, have developed rapidly in most recent times. The shifting, unique urgencies of defense procurement and weapons development have come to be fully appreciated. Industry sees itself in a dual function as a servant of defense needs and as a profit-making institution vital to the preservation of our way of life. With this concordance, giant strides forward have been made in the effectiveness of the teamwork between industrial and military research and development groups.

Not least among the changes that have followed this management philosophy is the organization of defense work. Take Burroughs as an example:

At Burroughs, military research and development are handled as distinct entities, blending with commercial work only when the two are clearly inter-related. At the Paoli Research Center, there are four technical divisions: the *Ballistics Missiles Division*, which is entirely devoted to problems of weapons system management through computation; the *Special Products Division*, normally about 90 per cent on military projects less massive and complex than those involving missiles and somewhat more closely relevant to the commercial interests of Burroughs; the *Engineering Services Division*, which integrates with other divisions in the areas of quality control, environmental testing, special construction and machine shop services, as well as maintenance and the reproduction of blueprints, specifications, and other printed materials. This division also does some industrial design relating to packaging equipment and some component engineering and the *Research and Development Division*.

The Research and Development Division carries on fundamental investigations sponsored almost entirely by Burroughs itself, with an occasional inquiry made for a military department. More and more in recent years, however, fundamental research projects have come into being because knowledge in the field is thought to be potentially important in the solution of military problems.

In other words, as the Company has gained insight into defense needs, it has also gained insight into the best ways for Burroughs to develop competitive leadership in the eyes of the military. The response to the needs of the military has had far reaching effects on the design of industrial research and development with consequent benefits in respect of strength, versatility and adaptability of our defense program.

Typical research of this kind is the long-range program of solid state magnetics and electrostatic recording going on for almost ten years in recognition of certain fundamental problems in high speed computation.

Beyond research, the Defense Contracts Organization was formed in 1950 and set up as a separate group in 1955 to handle all corporate Sales, Contracts Administration, and Military Field Service.

Organization of industry for defense work has produced some important fruits. It has permitted major improvements in research and development planning by both the military and industry.

Historically, various branches of the Defense Department tended to do their own planning. Problems were analyzed in isolation. When industry finally became involved it was more to adapt technological than scientific know-how to the problem defined. Similarly, in the past, industry personnel were insufficiently experienced in military needs and the distinct and often different applications of known equipment or a particular technology to military problems. This often resulted in wasteful, frustrating efforts to apply products and processes to problems which were not, in truth, properly related.

Today it is common for a program to begin with a contract from the military for an industrial group to coordinate problem analysis. This is the first step along a line leading to further contracts for the design of model equipment. Then follow field testing, model improvement which may actually involve new theoretical considerations, and ultimately working hardware. Here the highest order of coordination of military and industrial talents takes place . . . here is where real understanding and total im-

mersion in the problem take place as prerequisite to solution in the minimum time and with the least waste.

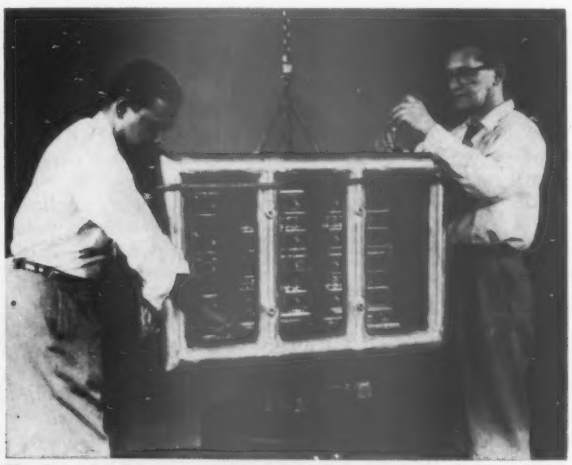
In addition, and of historical significance in the changing industrial scene, programming for military research and development may frequently involve two, three, or more corporations simultaneously, because of the known complexity and magnitude of a problem and the need to harness into teams the dovetailing talents of several organizations. This is not a new idea. For many years, complementary industries have looked to each other for scientific and technical assistance—the paper industry to plastics for resins to improve wet strength; engine builders to the petroleum and chemical industries for adequate fuels; among many other examples of the interdependence characteristic of American industry.

However, the extensive practice of linking groups of manufacturers into competitive teams to bid for military contracts . . . an airframe manufacturer, a rocket propellent organization, a radar specialist, a computer expert, and so on . . . is a striking advance over previous practice. From it is stemming critical and intensive examination everywhere of what it takes to do a total job in any market and where a company should concentrate its efforts to come out on top.

The case of research and development programming for ATLAS nicely illustrates this whole procedure and its inherent power and productivity.

The Air Force initiated the ATLAS program after years of slow research and study. When the opportunity to quote on the computer system for ATLAS was first given, technical aspects were still not resolved in sufficient detail. It was virtually impossible to forecast adequately the magnitude of the program to be undertaken. Vital breakthroughs, however, in obtaining nuclear sources of explosives, in power plant design, in propellants, and in related fields, rapidly took the intercontinental ballistic missile into advanced development . . . more rapidly, actually, than industry could honestly claim complete competence in the engineering areas to be integrated . . . more rapidly, at first, than the Armed Forces could secure the most rigid dissemination of large quantities of required information under the restrictions of top security classifications.

At the beginning, then, the computer development contract was awarded to Burroughs by the Air Force on this basis: First, a demonstration by Burroughs of its basic competence in the computer field; second, and of great importance, a commitment by Burroughs management, in advance of really knowing what would be involved, that full corporate facilities would be applied in whatever manner needed to complete the assignment successfully.



Shock and vibration tests were only one phase of the evaluation of computer components to be used with the ATLAS ICBM.

In this environment of mutual respect and close cooperation with the Air Force and other members of the industrial team, effort and results reached unprecedented heights and in perhaps one-third the time normally spent on an advanced development project. The outcomes included: improved, practical Direct Coupled Transister Logic; advanced Solid State Conincident Current Memory; as well as the first large-scale solid state computer built by Burroughs.

As this development work was proceeding on the computer proper, engineers from all the industrial team members, and the Air Force, were required to work together to advance the whole system design. This had to be done at the various establishments of each company and at several Air Force sites. Masses of secret mail had to be exchanged. Staff of the different companies had to be exposed to and become proficient in all the relevant subjects and Burroughs engineers and scientists were required to acquire detailed knowledge of such foreign fields as propulsion and aerodynamics as they affected computer design.

As knowledge and technique developed, industry was able to start the design of superior equipment almost faster than field tests of early models could be completed. Close industry teamwork proved to be a growing source of creative ideas leading to better solutions.

The impact of all this on Burroughs has been tremendous. The Air Force has continued to assign more and more responsibility to the Company, resulting in a twenty-fold increase in the level of operation. Consistent with management's commitment, staff has been increased proportionately and, as noted, a separate Ballistics Missiles Division has been incorporated into the Research Center. Plant capacity in engineering has increased by fifty thousand feet, and double that in manufacturing in order to execute the tasks assigned. In turn, this has made it possible for Burroughs to work with the military and other manufacturers in a way never before required and never before so fruitful. What is true at Burroughs is true throughout the major industrial corporations of the country, with profound, heartening implications for the speed, efficiency, and economy with which we can anticipate and solve defense problems of the future.

No matter where one looks, what is seen paints a vivid picture of the beneficial results of extensive integrations of defense work into commercial enterprise. As defense work has become organized into continuing, recognizable operations, some critical personnel problems have been resolved. No longer need people assigned to defense work think of themselves as transient and separated from the real interests of the company; no longer do they have to feel a need to apply know-how learned on military projects to commercial products in order to move careers forward. These stabilizing forces have added energy and output across the board.

There is no need to labor the point. While there is and always will be much to be done in the fight for perfection, there is little doubt that we are entering into a time of unprecedented capacity to meet current and anticipated defense needs.

For those of us close to the scene, this is a matter of great pride which should be everyone's to share. The visible evidence of increasing effectiveness of industrial management of military research and development has gone far to substitute poise for frantic reaction to every enemy claim and to substitute controlled speed in problem solving for the haste and waste of "crash" operations. This is a real accomplishment upon which to build for the future.

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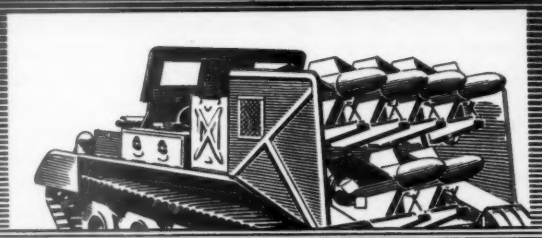

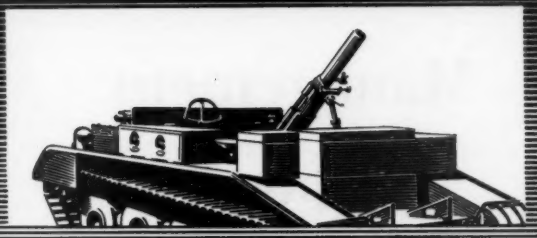

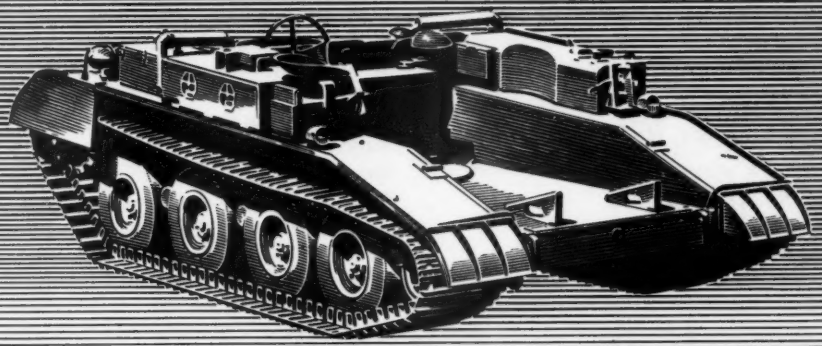

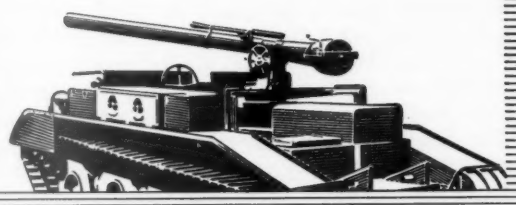

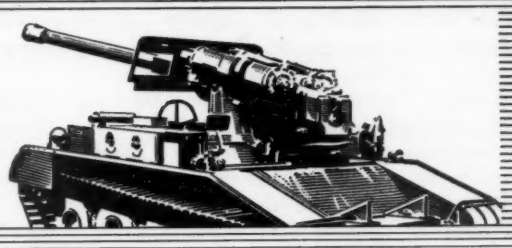

. . . FROM INCEPTION TO END PRODUCT

Adaptability of thinking and facilities at the Cleveland Ordnance Plant is reflected in the wide range of projects successfully undertaken for the Armed Forces. Adaptability has been achieved, too, in devising new uses for the currently "in-production" M-56 Scorpion. Designed as a 90 MM assault weapon, the M-56 is now ready to serve with equal effectiveness as a recoilless rifle or mortar mount, rocket and missile launcher, or as a personnel or cargo carrier. What's more, the ultra-lightweight aluminum and steel-alloy construction of the M-56 makes all of these adaptations air-transportable and air-droppable, as well as extremely mobile in mud, sand or snow. The adaptability of our engineering, our facilities and the "in-production" M-56 can help solve *your* ordnance problems, today.

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A Reader Comments on

Civil Service: The Management Bogeyman

As an indictment of a group of people, this answer to our December editorial, is not, we believe, quite accurate. But, as an indictment of a system, it appears to have better guidance than the Atlas missile.

YOUR editorial, as published in the December issue, was something of a surprise to me. There is still a question in my mind as to whether you were really serious in your queries, or simply employing rhetoric to "needle" various organizations.

The whole frustrating, insoluable, agonizing problem can be summed up in two words—CIVIL SERVICE. Civil Service, established originally to solve one problem (political patronage), is itself a far more costly and serious problem. In short, the cure has proven worse than the sickness ever was.

You asked for the "men who say this shop could be run twice as well with half the people" and I can assure you there are a few of them around. They are fairly lost to view, however, in the mass of self-serving, self-justifying, self-seeking, double-talking humanity above, below and all around them. Their voices are stilled by "creeping security" which is being extended slowly but surely to include any and all kinds of real criticism, no matter how valid or honest.

In the following example, taken from "true life experience," *A* is the lowest man on the totem pole, *B* is next higher, *C* next and so forth up the line.

A goes to *B* and says, in effect, "Boss, I've got wonderful news. For the first time in the history of this organization, we are in a position where we can request a *reduction* of some 20% of our personnel, without impairing our ability to do the job one bit. Pretty good, huh?"

B, who has been around some time longer than *A*, now proceeds to teach *A* some of the facts of life. 1—To begin with, how will we account for the fact (asks *B*) that we are able to do this today, but could not do it a year or two ago, since our workload has not decreased any?

2—Do you think *C* would consent to reducing the personnel ceiling in his department? Certainly not. He would say simply that if we don't need them, he does. They would then be shifted to positions probably doing less than they are now.

3—Even if *C* did go along, how about *D*? And *E*? None of these people want their units *decreased*. Since Civil Service grades (and therefore, salaries) depend upon how many people one supervises, the idea is to get more people, not less. Any ideas you have for making more, not less work, or complex, not simple, procedures will be gratefully considered.

4—Suppose we do get rid of the excess personnel, and then along comes some sort of crisis? Like having 5 or 6 key people out sick for a week or two. This happens. Where are we then? And we will have the additional accusations to contend with—"short-sightedness, poor judgment," etc. People would be only too happy to stoke the fires that fell upon us, since we went counter to the unwritten law, "No one ever reduces personnel voluntarily."

5—Now you say we can reduce our work force 20%. Take a look at the retention register. The majority of the people to go would be just the ones we would most want to retain. The clods and deadwood, having had nowhere to go, have hung around for so long they now have top seniority. The very people who have made this 20% reduction in force possible would be the ones to get the axe.

6—We can't start giving "unsatisfactory" work reports to people who have been getting "satisfactory" for a number of years. In such an event, it is the supervisor who stands trial since the Civil Service Commission will want to know what happened after all these years. In the typical Civil Service inquiry, the question at hand is not regarding the employee in point, but rather "Is This Supervisor Qualified to Judge This Employee?" In answering this question, the employee is free to bring up any and all subjects which may reflect upon the supervisor. Few supervisors being perfect, they would just as soon not be subjected to any such proceedings.

If *A* is idealistic, he may try to point out that every dollar wasted in any department, simply reduces the amount of money available to some worthy projects, such as more nuclear submarines. This type of argument is quickly brushed aside with the answer that "if we don't spend it here, they will waste it somewhere up the line."

You must remember, Mr. Borklund, that unlike industry, Civil Service does not reward economy through bonus arrangements, profit, or salary increases. It does precisely the opposite. If a supervisor is successful (I never heard of one who tried) in reducing his work force, he winds up with a lower grade, since he is in charge of a smaller department.

Supervisory personnel at the lower levels are able to maintain relatively clear consciences in spite of all this, because they see the far more costly gyrations and double talk of their leaders in Washington. It is

fairly clear to all of these people that the primary concern of the various government branches is not giving the most value for each dollar, but building their particular branch bigger than any of the others.

When Congress does cut the appropriations, what do the various Services eliminate? Waste, inefficiency, duplication, antiquated systems? Hardly, since in most cases they will not even consent that such things exist —at least, not in *their* particular branch. No, they start to cut the things that will reach the public's attention first, and hit where it hurts. They will reduce the armed personnel, the number of planes, the number of new submarines—in short, the things which will be cried and moaned over in the nation's press. This will teach Congress a lesson, and they won't be so all fired smart next year.

The waste from department to department at the working level is almost unbelievable. The systems with which I am personally familiar are a mass of designed complexity, the only reason for which is to make more jobs, and thus bigger departments. An off-the-cuff conversation with top management produced this startling statement: "We could reduce 100 people right now (out of 450) without impairing our effectiveness—if there were any reason for it."

Of course, there is that constant argument that Government accounting is always more "complicated" than anything private industry has to contend with. This is absolutely not true in any sense. The complications are manufactured internally. And the horrible truth of the matter is that when an emergency arises, such as Korea, the system actually breaks down in so far as accounting and controls are concerned. But who questions expenditure during a war?

Can anything be proven? Hardly, since it requires testimony. If a man works for the organization, and would like to continue doing so, he says nothing. If he quits to holler a little, who will listen and do anything; and isn't he tinged a little with "sour grapes" perhaps, because he couldn't get anywhere in the outfit? I doubt if the records could prove anything since the better parts of this masterful arrangement of double-talking data would quickly be "classified."

There are numerous statements regarding this whole situation which are untrue. Witness this typical heart-rending, tear-jerking untruth: "Certainly, there are a few mis-fits in Civil Service. Any group as large as this is bound to have a small percentage of less-than-desirable people. However, the great majority are loyal, patriotic, hard-working citizens, etc. . . ."

The precise opposite is true. The large majority are people who would leave Government service in five minutes by the clock if they could get $20 a month more anywhere else for as little effort. If they were indeed "loyal citizens" how could they possibly contribute to the monumental waste of the Nation's money in a time of economic war with the greatest enemy we have ever faced?

But I tell you in all sincerity that I have watched a man cause the Government to pour almost a quarter of a million dollars down the drain because it meant a two-grade increase for himself. And by pointing to similar failures throughout the system, he has so thoroughly rationalized the whole thing that he does not feel one bit guilty. Indeed, he is inclined to believe that anyone else might have caused half a million to be wasted, so he didn't do such a bad job after all.

If we face the facts, Mr. Borklund, we will have to admit that in the foreseeable future, nothing will be done about the system, because of the people in positions to do something, the great majority like it just the way it is. In the long run, of course, we will have to kill off "the system" before it kills off the country.

But most people are not nearly as interested in the economic condition of their country 100 years from now as they are in what they will have to eat for dinner tonight. The national debt has no real implications for most people. If they know about it at all, they know it can be raised again. And again. In the meantime, "We never had it so good, so what is all the squawking about?"

I'm afraid Big Government is here to stay, at least as long as you and I are around. And since Civil Service cannot be voted out, even if the people were so inclined, and further, since it tends to expand by the square of its number, it will get bigger and worse before it gets better.

If you, or anyone you know has any other answers, I should be very happy to hear them.

Sincerely,

J. K. STONEWALL

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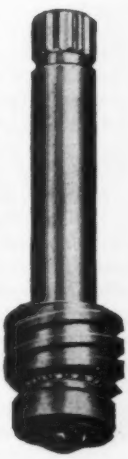

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This Month: Murray Snyder

Assistant Secretary of Defense for Public Affairs

NEXT month, on March 21, Murray Snyder will celebrate two years of walking what is probably the most sensitive tightrope in the Pentagon. As principal advisor on public relations matters to the Secretary of Defense (as well as a host of other key civilian and military officials in the Defense establishment), he heads a department which, on any given day, will touch base with nearly every office in the Pentagon, with Congress, the State Department, other executive agencies and just about anyone else with a real or imagined need to know some of the facts of military life in the Space Age.

Accurate dispensing of the news is not Snyder's only responsibility. His Office of Security Review screens for military security all material originating within DoD for public release—and similar material submitted from the outside. (Congressional testimony alone will run into millions of words and, to be sure they are right, Security Review people must travel all over the Pentagon.) His Office of Public Services is the contact for national organizations on Defense matters.

His office is the battleground for two opposing philosophies. On one hand, the security-minded people who start with the premise that any knowledge is valuable to the enemy and work back. On the other, the newspapermen—and some of the best in the business cover the Pentagon—who would never have enough information even if they were given every secret in the building.

Snyder is no shrinking violet, nor does he run his office from an ivory tower. He welcomes invitations, whenever possible, to address editors' conferences around the country and he likes to work out mutual news-handling problems face to face with editors' groups and representatives of the photographic, radio and TV industries. Because of his personal experience (over 20 years) in the news business, he understands the media problems. He is a warm defender of the integrity and competence of government career officials charged with responsibility for public information, however, and tells editors' groups that, if he returns to his old business, he will "never again enjoy the luxury of irresponsible criticism."

Snyder's job in essence: see to it that the American public, and all its special elements, is given an accurate picture of what's going on in National Defense, not let the advertising get ahead of the production department.

Too often in the past, Public Affairs has fluctuated between a close-mouthed censorship bureau and an "everybody tell everything" attitude. Under Snyder, they've walked pretty well down the middle of the road—in spite of nerves made sensitive by a whole new set of problems: missiles, space flight, Lebanon, Quemoy, Defense reorganization, etc.

Since there is not a newsman in Washington who doesn't have some need for Defense information, Snyder's staff is under constant pressure and, what is more important, must bat 1.000 on their facts. (Snyder himself reaches the office before 8:30 every morning, rarely leaves before 7:00 at night, takes home a briefcase bulging with more work. Few weekends are free and he has managed just one real two-week vacation in two years. Most of his key assistants are caught in the same ulcer-provoking web.)

Snyder is the first man to credit his success to his staff. "I am blessed with a very competent crew," he says. "Washington reporters are best acquainted with Orv (for Orville) Splitt (director of the Office of News Services). In dealing with newsmen, he is truthful, responsive to their needs, and doesn't kid anyone—but he's as zealous as any military man here in guarding legitimate security information."

48-year-old Murray Snyder got into the newspaper business almost by accident. Born in Brooklyn, N. Y., he grew up in San Antonio, Texas, was offered a job as sports writer for the San Antonio Light in 1928. He accepted because "it sounded like it might be interesting," has been in or around the newspaper business ever since.

After World War II service, he joined the *New York Herald-Tribune*—a move that was to steer him eventually into the Pentagon. As the *Tribune's* chief political writer in the New York area, he covered political conventions of both major parties and political campaigns from coast to coast—and came to know Jim Hagerty (now President Eisenhower's press secretary) very well.

When Hagerty moved to the White House with Eisenhower in 1953, he asked Murray Snyder to go along as his assistant.

At the White House he had been a spokesman more than an administrator, saw reporters almost constantly. Today the emphasis has switched the other way around. Now his job is more one of arranging for someone else to do something—and the pressure is more constant.

With the passage of the 1958 Defense Reorganization plan, Murray Snyder acquired a new responsibility. To quote President Eisenhower, "Stronger supervision and control by the Secretary of Defense over public affairs throughout the Defense establishment has been a major goal in the reorganization plan. Because of their great importance in the effective execution of national defense programs, public affairs activities are today a major command responsibility. I look to the major commanders (of the Unified Commands) to insure that public affairs activities throughout all echelons of their commands properly reflect our national aims and objectives."

Direction and guidance on all public affairs matters are to be handled directly between the Unified Commands and the Secretary of Defense, Neil McElroy. McElroy has delegated this responsibility to Murray Snyder.

To handle the new task, Snyder will work closely with the Joint Staff, coordinate with the Services. For this problem and to solve some other headaches, he has also set up his own Plans and Programs group. Headed by an Army officer, it includes an officer from each of the Services and one civilian, all carefully selected. Their job: make sure that all Service sides of a problem get a word in, and that the viewpoints fit top-level Defense goals.

Why this interest in fairness, accuracy, and working together? It is more basic than just wanting to see harmony. In his six years in Washington, Snyder is convinced of one thing: "Probably in no other one place is there such an outstanding collection of talented, even brilliant, people. When they work in harness, in a joint effort, some of the things they accomplish are amazing. When they are at odds, and inflexibly advocate a different school solution to a mutual problem, too often their efforts cancel each other out—and progress is nil."

Procurement and Logistics

A NEW BREED OF RESEARCH AND DEVELOPMENT CONTRACT is in the immediate offing. Air Force and General Electric Co. are presently working out the details at the AF Ballistic Missile Office, in connection with GE's nose cone R&D work. Aim of the new set up is to give industry a fairer shake for a job well done, through higher profit margins. Decision will come from AMC, and there is a chance for wider application if the contracting system proves successful.

MAJOR DIFFERENCE BETWEEN A-PLANE AND A-SUB DEVELOPMENT is that the A-plane is committed to a single line of development, while the sub had alternative courses open. To this extent—to say nothing of short funds and erratic backing—the A-plane program is weak. If the present development program bogs down, there will be nothing to fall back on. On the other hand, Nautilus had a water-cooled reactor to fall back on when the sodium-chloride power plant fluffed.

MOST VEXING PROBLEM FOR INDUSTRIES IN DEFENSE WORK is not low profit margin, but the seeming inability for military buying types to make a decision. Outstanding exception would be Air Materiel Command's Lt. Gen. "Bill" Irvine, who, say industry sources, was willing to say yes or no "even as a colonel."

CONCERN IS GROWING IN THE NAVY OVER FLEET OBSOLESCENCE as the "hump" of World War II ships near the end of their 15-20 year useful lives. With conversion costs uncomfortably close to the cost of new ships, Navy has their hands full. Navy is afraid that it will take a major war to stir up the money they need, but they know by then it will be too late.

INDUSTRY PRIME CONTRACTORS ARE WATCHING SMALL BUSINESS POLICIES with growing frustration. The reason: Primes will develop a small business subcontractor, and as soon as he proves his worth, he is likely to outgrow the 500-employee limit, forcing the prime to start all over again.

RENEGOTIATION ACT IS LOW ON THE CALENDAR of the House Ways and Means Committee. The committee's schedule is extremely full, and the Renegotiation Act probably won't come up before March.

RELIABILITY AND QUALITY CONTROL are the subject of a report that has been put together for the House Appropriations Committee by a group of specialists. Although parts of the document are classified, the greater section will reach the public record.

THE BATTLE OF THE BUDGET WILL BE HARD AND FAST in the House Appropriations Committee, with Congressmen trying to hike the President's $40.85 billion. Key argument will be that dollar values have dropped more than the Defense money was increased, thereby causing what is actually a cut in the money. Prime example: Convair's B-58 Hustler, which was more expensive than originally estimated because of dollar value variations, and had to be trimmed accordingly.

GAG-RULE MEMO ISSUED BY BUREAU OF THE BUDGET will be particularly annoying to Army and Navy top brass appearing before Congress. (see Washington Background news, p. 8) Their complaint: While the nation is running headlong in the much touted race-for-space, limited war equipment is fast becoming obsolete, badly needs to be modernized. With gag rule in effect, there will be no pulpit for these men to preach.

Saltonstall Bill Handed to Senate

The anxiously awaited and highly touted Saltonstall Defense Procurement bill has been introduced to the Senate by its sponsor, Sen. Leverett Saltonstall, (R-Mass.). The bill has slight differences from the similar measure the Senator introduced late in the last session of Congress.

Major aims of the bill are (1) to reduce lead times needed for new weapons, and (2), to streamline procurement practices and cut administrative detail in the Pentagon.

The major points in the bill—which generally make legal those practices which are now in use—are as follows. (1) Negotiation, competitive negotiation and formally advertised bidding would be given legal equality. (2) Extend the weapon system concept, under Operational Procurement. (3) Eliminate renegotiation on fixed-price, formally advertised and incentive contracts. (4) Put the Congress on record as emphasizing needs for fast development of weapons, small business participation in prime and subcontracts.

The bill would also eliminate elaborate specifications and institute simpler performance specifications, increase small business participation on the subcontract level, lift the limitation on incentive contracts and encourage the use of incentive and fixed-price contracts.

Standard Spares Form Explained to Industry

A standard form for technical provisioning documentation which could have eventual savings potential of $20,-30 million yearly was described recently to a Military/Industry Seminar in Washington.

Basis for the new system is Defense Department Instruction 3232.7, which sets up a 22-column Standard Spares Documentation Form. This form can be filled out manually, or with electronic accounting or data processing equipment. Theoretically, the form provides a place to fill in all basic information needed by both DOD and Industry.

According to Ray R. Willauer, of General Electric Co., there will be five specific areas improved under the new system: (1) the new format will be familiar to both military and industry, and will ease exchange of information. (2) the form sets up routine procedures so that fewer specialized personnel are needed to produce or interpret documents. (3) time cycles will be cut. (4) expensive and expansive data will be reduced, and (5) errors will be reduced.

Willauer said these improvements would provide considerable manpower, time and money savings, but that these savings "will not be accrued immediately, and can only ultimately be realized by correct and careful usage of the document." He added, that 3232.7 is "limited or expandable as determined by military, industry and end item peculiarities.

Sergeant, Army's first second generation missile has moved into the developmental hardware stage. The 30-ft. solid propellant missile will replace Corporal in the Army's arsenal.

The Budget: Who Gets How Much for What

The Defense Department will receive $40.85 billion in new money during fiscal 1960, under President Eisenhower's recently submitted budget. Air Force and the Office of the Secretary of Defense (including ARPA) will get more money than last year, and Army and Navy will take cuts.

Army will get $9.557 billion, Navy will get $11.46 billion, Air Force will receive $18.732 billion, and the Office of the Secretary will get $1.441 billion, with $445 million slated for Advanced Research Projects Agency. Of the total DOD budget, approximately $22.447 will be spent on operating costs.

Procurement will claim $13.348 billion, broken down as follows: Aircraft, $6.197 billion; Missiles, $3.548 billion; Electronics and other procurement, $2.261 billion. Research, development, test and evaluation money will amount to $3.722 billion in fiscal 1960.

Missile spending will be about $600 million under fiscal 1959, primarily because of terminated programs. In this category fall Rascal, Regulus II, Goose, Thor, Jupiter and Redstone. Actual missile spending will run to about $7 billion, because it will include Polaris submarines, submarine tenders and ground support equipment.

A further breakdown of the overall Defense budget shows the following direct obligations: Military Personnel will claim $11.9 billion; Operations and Maintenance, $10.5 billion; Procurement, $14.9 billion; Military Construction, $1.5 billion.

By the same categories, expenditures will be as follows: Military Personnel, $22.3 billion; Operations and Maintenance, $10.3 billion; Procurement, $13.9 billion; Military Construction, $1.7 billion.

The budget will buy a total 1,610 aircraft—150 less than fiscal 1959. Air Force is slated for 703, Navy for 668, and 239 for the Army. Air Force will buy nearly 100 B-52Gs, roughly 90 KC-135s and 40 of the new B-58 medium bombers. AF will not buy any Century series interceptors, but will purchase jet and/or propjet transports, small utility jets, trainers and support aircraft.

Air Force will push development of the B-70 and the F-108, both Mach 3 aircraft. Spending on a nuclear airplane will remain approximately constant at $150 million.

With the greatest part of its money, Navy will buy fighter aircraft. It will also buy a smaller number of attack aircraft than last year. The Martin P6M program has been stopped.

Missile money has been substantially lowered from last year for two reasons: first, several programs have been halted, and, second, much missile "procurement" funds have been transferred from that category into the new Research, Development, Testing and Evaluation item. Missiles to be purchased include Atlas, Titan, Mace, Quail, Falcon, Minute Man, Hound Dog, Bullpup, Sparrow III, Eagle, Corvus, Polaris, Tartar, Terrier and Talos. Also, in the Army, money will go for Pershing, Sergeant, Nike-Hercules, Hawk.

Ballistic Missile Early Warning System (BMEWS) and Semi Automatic Ground Environment will take a good part of the "Other" category, with the rest to be used for items including

trucks, rifles, machine guns, communications and tanks.

Last year's service budgets were the following: Army, $9.718 billion; Navy, $11.958; Air Force, $18.717; DOD, $1.279, not including funds for ARPA.

Missile Probe Due This Week

An investigation of the U.S. missile program management set up is due to begin sometime this week. Air Force will furnish the first witnesses before the House Government Military Operations Subcommittee.

The probe will begin with the recent controversial report by the Air Force Inspector General which was withheld from the General Accounting Office. The document was reportedly critical of missile program management in the Air Force.

Regarding this report, the subcommittee will probably touch areas already probed by Rep. John Moss (D-Calif.), but it is also expected to give a close look to the overall program, and AF relations with Ramo-Wooldridge in particular. GAO is conducting a parallel study.

Unnecessary Reports Under Fire at AMC

Air Materiel Command has declared war on all unnecessary reports, and is in the midst of a fight to cut out this non-essential paperwork. All Air Materiel Areas were told to list those reports which are essential for operations by the end of January.

Reports which are not listed by January 31 will be eliminated, but there are indications that this deadline will be extended. Aim would be to insure that the problem of excess paper work is thoroughly in hand before issuing a directive barring certain reports.

It is expected that the final result of the battle will be to have AMC refuse to pay for reports other than those listed as approved.

Irvine Asks Industry For Better Pricing

Improved pricing practices are needed in industry, according to Lt. Gen. C. S. Irvine, deputy chief of the Air Staff for Materiel. Irvine spoke recently to an AF/industry conference in Palm Springs, Calif.

"Over the past several months," he said, "post audits of contracts have pointed up some serious discrepancies between actual costs which were current at the time of contract negotiation and the prices submitted with bids. Whether these differences resulted from honest mistakes, or from expected price increases is not important. The fact that the discrepancies were neither explained nor corrected makes them suspect."

Because of this, AF is now requiring industry to certify in writing that the quoted prices are actual costs. Irvine called the problem "serious and immediate. While there is no implication that fraud or deliberate malpractice is taking place, there is sufficient evidence of 'errors' in this connection to warrant corrections. If over pricing continues, the Air Force may find it necessary to conduct pre-audits of proposals."

Fixed-Price Contract Planned for Atlas ICBM

Air Force will have drawn up its first fixed-price contract for intercontinental ballistic missiles within the next few months, according to Maj. Gen. Ben I. Funk, chief of the AF Ballistic Missiles Center.

Presumably, the first contract will go to Convair for their work on the Atlas. The present Atlas program has over $400 million dollars, and has been arranged by letter contract. The program calls for 130 ICBMs, including a few Titans.

Navy Printing Method Saves Time and Money

A lesson learned from the printing trade is offering the Navy potential savings of over $800,000 yearly in reproducing its 150,000-page-plus Stock List. Called Foto List, the new process is also showing manhour savings of about 52%.

Heart of the new system is a card writer, a machine similar to Vari-Type, which types copy a line at a time, with one line on each card. When this is done, the cards are punched for electronic accounting machine sorting and identification.

The cards are then fed to a counter which selects the correct number for each finished product page. When the cards are sorted, headlines and pictures are inserted, and the card-page is sent to a Foto List photographic machine, which can take as many as 2700 cards, or lines, per hour. Navy anticipates that the camera rate can be doubled in the future.

From there, the photographed pages are sent to the printer. Under the old system, which had Vari-Typists work with a whole page at a time, only about 2/3 pages could be prepared for the printer per man-day. Under the new system, this is increased to 1.4 pages per man-day.

Small Business Unit Scores DOD Practices

The Senate Small Business Committee and the Subcommittee on Government Procurement have criticised the Defense Department for not giving enough prime contracts to smaller firms. The two committees point out that these awards have dropped in percentage "almost continuously" in the past few years.

The report, largely based on public hearings at the end of the last session of Congress, made several recommendations. It suggested that procurement provisions in the Small Business Act of 1958 be quickly carried out, and that Army and Navy small business specialists should be given more authority.

Also the report said that firms other than the original prime contractor should be given a chance to bid on replenishment contracts, and that the Government should obtain all rights to items in development contracts so that other manufacturers could produce them.

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Air Launched Missiles Tested by Air Force

Air Force has announced "successful" tests with two different air-launched ballistic missiles, using B-58 and B-47 aircraft as launching platforms. The two development studies are labeled ALBM (WS-199B, Air Launched Ballistic Missile) and Bold Orion.

WS-199B was test fired from a B-58, and traveled over 300 miles; Bold Orion was launched from a B-47 and covered roughly 1000 miles. Both missiles were fired at Cape Canaveral, and the two weapons are in competition under an Air Force study contract. WS-199B is a Lockheed project and Bold Orion is being developed by The Martin Co.

The Martin missile has been extensively tested in free-fall drops since last summer. Both stages of the two-stage missile were fired from a drop altitude of about 35,000 ft. on December 16.

WS-199B is an outgrowth of the X-17 experimental rocket. The missile is said to be about 25 ft. long, with a three foot diameter. Weight is roughly 3.5 tons.

Some Air Force planning would couple this type of missile with atomic powered aircraft, enabling the planes to fire missiles from 1000-1500 mi. away from the actual target.

Navy Needs Plane For Eagle Missile

Navy will either have to build a new plane or modify an existing model to handle the new Eagle air-to-air missile. Eagle is intended to implement the Navy theory of marrying low-speed aircraft with high performance missiles for air defense work.

Leading proponent of this "marriage" has been Navy's DCNO for Air, VAdm. Robert A. Pirie. Pirie has said that there would be no need to "bore supersonic holes in the sky" if the theory works. The "airborne heavy cruisers" would serve as high-endurance missile platforms, allowing the missiles to provide their own speed.

NASA Awards Contract For Man-in-Space Work

McDonnell Aircraft Corp. has won a National Aeronautics and Space Agency competition to begin work on a manned space capsule program. Major program subcontractor for electronics will be Collins Radio.

The $15 million program is expected to run for about two years. McDonnell will design, develop and build the satellite. It is expected that an Atlas missile will be used to fire the manned satellite into orbit, where it would remain for about 24 hours at an altitude between 100 and 150 statute miles.

After the brief orbit, the satellite will theoretically return to the earth. It will have a blunt, heat shield nose cone, fitted with a retro rocket, to hold below speeds which would burn it up upon re-entry. Once within the atmosphere, the capsule would be lowered by two parachutes—one for stability, and one for the actual landing.

The capsule will be buoyant and stable in water, and will be equipped with tracking beacons, flashing lights and sulphur bombs to aid recovery teams. Robert R. Gilruth will head a task group for the project, under Abe Silverstein, NASA director of space flight development. Headquarters for the project will be at Langley Research Center.

Fleet-Wide Use Planned For DASH ASW Concept

The DASH concept—Destroyer based Anti-Submarine Helicopters—may find fleet-wide use as an "excellent interim stand-off weapon in cost and effectiveness," according to RAdm. B. J. Semmes, commander, Destroyer Flotilla Three.

Semmes said that new acoustic devices under development will require considerable time and money in retrofit programs, but that the entire Navy destroyer fleet—more than 300 ships—can be modified for helicopter operations in a few hours. Semmes made his remarks at a recent demonstration of DASH operations off the Southern California coast.

Army Completes Study On Small Helicopter

Army has recently finished a design study for a two-place observation helicopter to determine the feasibility of designing a new smaller helicopter to perform many missions and functions more economically than present models.

Basic purpose of the study at Ft. Eustis, Va. was to gain information which would aid in decisions relative to replacing small helicopters now in the Army system. Meeting established performance needs, achieving low production costs and maintenance requirements were among the primary goals of the study.

Polaris IRBM poised on Cape Canaveral launch pad prior to blast off. Solid propelled missile has range up to 1500 miles, will be submarine launched. Navy plans may include 3000-mi version of the missile, which could reach all land points on earth's face.

Preliminary designs considered reciprocating engines or the Army's new 250-hp turbine engine. Study results are presently being evaluated. Participating in the program were Bell Helicopter Corp., Doman Helicopters, Inc., Kellett Aircraft Corp., Nagler Helicopter Co., Inc., Gyrodyne Co. of America, Inc., and Hiller Helicopters.

Army Plans to Speed Research Operations

Army has set up new procedures, under AFR 705-5, aimed at speeding research and development work. Aim of the plan is to cut the lead time needed from conception to completion of an R&D program.

Major steps in the new AFR will begin production engineering earlier in the development cycle, use standard parts in R&D equipment and reduce the testing period without cutting weapon reliability.

Specific items in the regulation provide for (1) establishing and reviewing military characteristics, (2) assigning and reviewing priorities, (3) testing sequence and overlapping or combined conduct of tests or other steps in the development cycle, (4) using standard commercial parts and components, and, finally, improving communications between Army agencies and their contractors.

Communications Centers Made Mobile by Army

A new, highly mobile, air transportable communications center has been developed by the Army. The new center can be carried easily by either truck or helicopter.

The center provides a nucleus operation for networks of radio, telephone, telegraph or teletypewriter communications. The centers have separate aluminum shelters, each fully equipped and independent. Three shelters would be used with small, front line units, while up to 24 could be used for larger headquarters. Army also says that the new centers will aid in restoring knocked-out communications.

While each shelter carries its own power supply source, they can be plugged into central power supplies. It is the first fully air-transportable communications center of its kind.

Tiny Atomic Generator Built for Space Work

A five pound 5½" by 4½" atomic generator has been developed by two private firms, and will probably find near-future use in U. S. space programs. Developers are The Martin Co. and Minnesota Mining and Manufacturing Co.

The small generator would be used to power broadcasting units and instruments in space. Producing five watts of energy, the generator can operate indefinitely with loss of about one-half of its potential power every 138 days.

its own individual proposals on projects of its own origination. However, when such projects provide opportunity for the interchange of compatible resources resulting in a superior joint capability, the companies will collaborate on proposals for missile and space projects to the military services, the Advanced Research Projects Agency of the Defense Department and NASA."

C-130 to Carry Its Own Spares

Lockheed Aircraft Corp's Spare Parts Department, working with Warner Robins Air Materiel Area, has developed a fly-away kit of inexpensive but essential space parts for the C-130 Hercules.

Although this technique has been used with fighter-type aircraft, this is the first time it has been applied to aircraft as large as the C-130. Aim of the kit is to avoid costly layovers for want of spare parts.

There are over 1500 different type parts in the kit. According to one Lockheed official, "A one dollar part could conceivably keep the $2.5 million Hercules down when possibly it is needed most." Cost of the kit is about $11,000, but one of the kits will service a squadron of 16 planes for 90 days.

Electronic Countdowns To Cut Atlas Launch Time

An electronic checkout and launching system for the Atlas missile has been developed for the Air Force by Radio Corp. of America. The system will speed countdown times for the ICBM, allowing for near-immediate retaliation in case of attack.

"The new system," says one RCA official, "is designed to reduce substantially the countdown period for launching the missile from the ten or fifteen hours now required . . ." First of the new systems will be installed at Vandenburg AFB, Calif.

The system is basically a digital computer set up to determine whether the missile is ready to go. The system also prevents trouble caused by trying to hurry the cycle—the missile will not fire, for instance, unless its fuel tanks are filled.

Gyro Flotation Material Withstands Heat, Cold

A new flotation fluid for floated gyroscopes is being hailed by Sperry Gyroscope Co. and the Air Force as a technological breakthrough in that field.

The new fluid will pave the way for all-latitude, all-weather gyroscopes which will operate in temperatures down to –65°F without external heat. These devices formerly required heat for both storage and operation. These floated gyros provide guidance for many of the nation's advanced aircraft and missiles.

The fluid was developed in conjunction with the B-58 program. Because the fluid remains viscous at such low temperatures, there is greatly reduced danger in sudden temperature changes for the gyros in which it is used.

Industry Developments

Long Island Space Team Set by Three Companies

Republic Aviation Corp., Grumman Aircraft Engineering Corp. and Fairchild Engine and Airplane Corp. have jointly announced plans to form a "space projects team," to provide mutual aid on space age scientific research, engineering and production programs.

The facilities, equipment and scientific skills of the three firms will be joined "whenever advisable on new astronautics projects."

In a joint statement, presidents of the three firms said "the new Long Island three-company cooperative effort will not interfere with programs being carried out individually by each company in aircraft or other fields. Each company will, ordinarily, prepare

Sparrow III air-to-air homing missile is fired by F3H-2. The 12 ft. 350 lb. missile is radar controlled, offers better range, field for fire than previous missiles. The missile can be fired in rapid sequence, and is entirely self-operating, once released.

Newsletter

Armed Forces Management Association
Room 3C136, The Pentagon, Washington 25, D.C.
Phone: OTis 4-7193

National President: Rawlings S. Poole **Executive Director: VAdm. Harry E. Sears, USN, ret.**

AFMA Newsletter is issued monthly by the Armed Forces Management Association through the cooperation of Armed Forces Management magazine to inform the membership and AFM subscribers of the aims, projected programs, and current activities of the Association.

Program Highlights

In keeping with good management practices, a critical self-analysis of AFMA, mid-term of its current fiscal year operations, recently completed. Designed to answer the general question, "How are we doing?", results of the review were revealing, significant and encouraging. Answers to specific questions relating to fulfillment of objectives relating to contributions to better defense management, services to the membership in personal education and professional guidance, and transmittal of useful management knowledge and the rendering of other services to industry members were sought with the following findings:

Effective Contributions to defense management betterment are being made through the media of AFM magazine and the AFMA *Journal,* seminars and round table discussions at the national and chapter level and a modest amount of fact finding service at these levels. Effectiveness of this area of the program increasing with enlarged scope and content of Association's house organs, and as group discussion techniques are developed, standardized, and disseminated; and fact finding service is expanded.

Services to the membership. Individual and Corporate, constantly in the forefront of AFMA planning, showing a marked upturn with issuance of guidance material and administrative short cuts for better chapter management; the availability of management extension courses for the individual members; a fact finding and problem solving service for Corporate membership and chapters; and the dissemination of defense management techniques to Corporate members. Further improvement in these areas expected as new features, now in planning stage, materialize.

A study of other elements of the program revealed:

National Conference plans continuing as scheduled. Industry cooperation, especially in exhibits area most gratifying. "The Role of Management in the Collapse of Time," the conference theme, to be highlighted by its author as a keynote speaker. With last year's outstanding conference as a guide, '59 affair promises to be even better. Reception evening of 26 May by AFM magazine for the many distinguished guests from industry and defense, will be an important added feature.

Publications. Letter sent recently to C. O.'s of all top management schools in DOD requesting copies outstanding papers on management topics by student, faculty, and guest speakers for publishing in AFM and the *Journal.* Addition of these presentations should widen and improve management knowledge disseminating aspect of these media. Response to publicity item in *AF Management Summary Sheet* immediate and heavy as management minded young AF officers request information on AFMA program and objectives.

Membership. Individual up 25 per cent since September. *Chapter requests* stand at twelve, a potential 60 per cent increase in chapter numbers. *Corporate* up nearly 500 per cent in same period. AFMA welcomes to its rapidly expanding family of company members *Royal McBee Corporation, Cities Service Petroleum, Inc., American Telephone and Telegraph Company, The Gray Manufacturing Company, Lockheed Aircraft Corporation, Thiokol Chemical Corporation, The Garrett Corporation.*

Fiscal position. Shows considerable improvement despite increased administrative overhead, and promises ever increasing realization of program objectives and services to the membership. Modest AFMA budget for '59 has proven realistic and will not be exceeded. Low *AFMA dues,* designed to spread AFMA benefits to the largest number of management minded people, will remain the same for the remainder of fiscal year at least.

Editorial Advisory Council for Armed Forces Management Magazine announced. AFMA is proud to announce that the following officers have consented to act in an advisory capacity to Armed Forces Management Magazine: Lt. Gen. Arthur Trudeau, Chief, Army R&D; Lt. Gen. Roscoe C. Wilson, DCS Development, Air Force; Maj. Gen. Roy M. Gulick, QG, USMC; VAdm. E. W. Clexton, Chief of Naval Material. Principal Group objective will be the dissemination of the latest information on management improvement. They will naturally have no responsibilities for magazine editorial policies as a whole.

Management Tools. Read "Public Officials and their Heritage," by Public Administration Service. Copies Available from PAS, 1313 E. Twentieth St., Chicago 37, Ill.

Job Availability Service. AFMA is happy to cooperate with installations having position availabilities which they wish to announce. (See *Professional Services* section elsewhere in magazine.) Forward these to AFMA Headquarters or to Armed Forces Management Magazine direct.

Every Member Get a Member—or Several

(For further information on individual or corporate membership in the Association, circle number 200 on the business reply card on p. 49 or write AFMA direct.)

Key AFMA Officials From National Hq.

The following list contains key personnel at National Headquarters Armed Forces Management Association. The list is published in answer to many requests for this information by Association members.

President: Rawlings S. Poole; Special Advisor to the President: VAdm. Murrey L. Royar (ret).

Executive Vice Pres.: Maj. Gen. Robert W. Ward; Assistants to Exec. Vice Pres.: Brig. Gen. C. W. Cecil, Gus C. Lee.

Executive Director: VAdm. Harry Sears (ret.); Administrative Officer, Esther V. Campbell; Staff Secretary, Patricia A. Lachance. Director, Public Relations, Orville S. Splitt; General Counsel, Sherry B. Myers; Executive Sec'y, Margaret E. Moore.

Chapter Services Office:

Vice Pres., Brig. Gen. Thomas J. Gent, Jr.; Ass't Vice Pres., Col. Fred F. Vreeland; Dir., Chap. Charter Svcs, John Reading; Dir., Chap. Extension Svcs, Claude Alsop; Dir., Chap. Administrative Svcs, Col. J. L. Tarr; Dir., Membership Policies, T. E. Sims; Dir., Nat'l Awards Program, Cdr. Eric Newberg.

Programs Office:

Vice Pres., VAdm. E. W. Clexton; Ass't Vice Pres., Brig. Gen. C. R. Allen; Dir., Workshops Project, RAdm. E. F. Metzger; Dir., Research Studies, G. O. Pehrson; Dir., Industry Programs, O. F. Ramsey; Dir., Educational Institutional Programs, Dr. L. A. Pingitore; Dir., Chap. Programs, Cdr. G. W. Harper; Dir., Departmental Programs, George K. Jacobi; Aide to VAdm. Clexton, Cdr. W. L. Flowers.

National Conference Office:

Vice Pres., Col. Paul O. Hoffman; Gen. Chrm., Brig. Gen. Carey A. Randall; Vice Chrm., Planning, Maj. Nicholas A. Beninate; Exec. Vice Chrm., Planning Lt. Col. John T. Heston; Vice Chrm., Program, Col. Donald B. Wilson; Exec. Vice Chrm., Program, Leon Burnham; Vice Chrm., Nat'l Conf. Banquet, Thomas Kouzes; Vice Chrm., Publicity, C. G. Abrams; Vice Chrm., Facilities, Frank Urmey; Exec. Vice Chrm., Facilities, Wayne J. Franklin; Vice Chrm., Finance, Maj. T. B. Hobson; Exec. Vice Chrm., Finance, Capt. William Coghill.

Publications Office:

Vice Pres., Edmund Dwyer; Chrm., Editorial Bd., Harry Hadley; Dir., Public Relations, Lt. Col. A. R. Scholin; Deputy Dir., Robert Graham.

Plans Office:

Vice Pres., Howard Hyde; Ass't Vice Pres., I. M. Greenberg; Treas. & Chrm., Finance Comm., John Snyder; Dir., Program Schedules & Progress Reports, Cdr. Eric Newberg.

Chapter Briefs

National Capitol Chapter. Eighty members and management guests attended a successful meeting on "Engineering Performance Standards" in the Pentagon on 15 January. Mr. Arthur Uscher, Office of the Comptroller of the Army, chaired the panel conference and the question and answer period following. Mr. Clyde Klinstiver, Office of the Quartermaster General, discussed the installation of EPS in this tech service of DoA. He was followed by Lt. Col. Robert Borman, Management Engineering and Management Branch, who presented the AF program. Mr. Jack Rouse, Navy Management Office, spoke on the Navy EPS system.

This general theme was also the subject of a dinner meeting held at the Army and Navy Club on 27 January. Sponsored jointly by AFMA and the Society for the Advancement of Management, the panel discussion was entitled "How Applicable Are Industrial Engineering Techniques to Government Activities." Chairman of this meeting was Mr. John I. Thompson, President J. F. Thompson & Co. and panelists were Capt. Frank P. Brown, USNR ret., Director Industrial Methods Division of ONM and Mr. William K. Hodson, V. P., H. B. Maynard & Co., Pittsburgh, Pa.

Hawaii Chapter reports a board of directors meeting held at Hickam Air Force Base on 10 December followed by a general meeting held at Schofield Barracks on 15 January, with principal speaker Lt. Col. Walter C. Flanders, Deputy Comptroller, HQ, USARHAW/25th Infantry Division, who spoke on "Management Engineering in the Army."

This chapter, making a strong bid for President's Annual Award for outstanding AFMA Chapter, has a comprehensive program, excellent attendant publicity and fine rise in membership which includes civilian and military from Army, Navy, Air Force, Coast Guard and Marine Corps.

New York Chapter, through excellent suggestions recently received from Commandant Third Naval District to improve its effectiveness, reports a membership rise of nearly 200% since September and a developing program of activities and services to its membership. President, Maj. Robert A. L. Bentley; Secretary, Colonel Benjamin Fowler, 390 First Ave.

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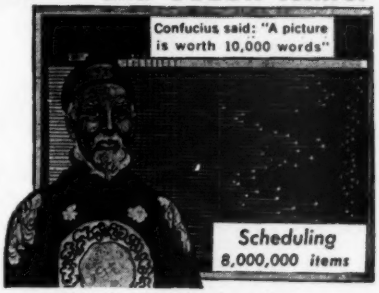

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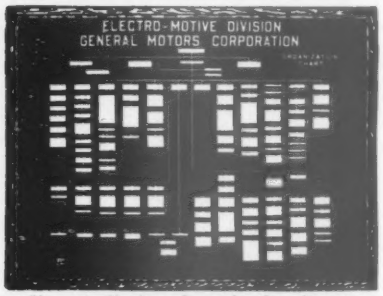

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Personnel Preview

Asst. Secretary for Air To be Dropped by Navy

Navy will eliminate its post of Assistant Secretary for Air early this month, under the Pentagon Reorganization Act passed by Congress last year. Deadline for abolishing the office is February 6.

Both Army and Air Force are required to drop one Assistant Secretary under the law. Air Force has dropped its Ass't Secretary for Personnel, David S. Smith, and Army has abolished the post of Ass't Secretary for Civil-Military Affairs.

Assistant Secretary for Air, Garrison Norton, will take over as head of Institute of Defense Analyses, a nonprofit group set up to aid Weapons System Evaluation Group, among other things. Norton replaces Dr. Herbert York who is now Director of Defense Research and Development.

Military Officers Report to FAA

Thirty-six select military officers have reported to the newly-formed Federal Aviation Agency for indoctrination and assignment to posts within the agency. Included are 18 Air Force, 12 Navy and six Army officers.

An additional 36 officers will be added within the next few months. With the military men carried over into FAA's Bureau of Research and Development from Airways Modernization Board, the military complement at FAA will be 135 officers.

Army Names Advisors For Aviation R&D

Army has named an *ad hoc* advisory panel on Army aviation research and development, to provide the Chief of Transportation with counsel of recognized civilian authorities.

Named to the panel are: Prof. Rene Miller, Massachusetts Institute of Technology; Prof. A. A. Nikolsky, Princeton University; Dr. August Raspet, Mississippi State University; Jerome F. Lederer, Flight Safety Foundation, Inc.; and Richard V. Rhode, National Aeronautics and Space Agency. Heading the panel will be Brig. Gen. Benjamin S. Kelsey (USAF-ret.).

Army Announces Changes In Pentomic Organization

Infantry and Armored Divisions, and Armored Cavalry regiments organized under the Pentomic concept will undergo minor organization changes, according to Department of the Army. The Pentomic concept has been under active field tests for the past two years, including all situations short of actual combat.

The changes will have no effect on unit strengths, but will cause minor internal changes. The Pentomic organization is designed for use on both atomic and conventional battlefields.

Aim of the reorganization is to increase ability of the units to absorb new weapons, and to improve target acquisition, combat surveillance, firepower and mobility. Major switch will serve to increase strength of division artillery using conventional weapons.

Units to be converted to Pentomic structure in the future will incorporate the changes. Army officers have predicted that changes in Army organization in the next two decades will be even greater than the switch to Pentomic structure.

Top Civilian Award Goes to AMC Man

Air Materiel Command employee Jack E. Reynolds has received the highest Air Force civilian award—the Exceptional Civilian Service Award. The presentation was made by AMC Commander E. W. Rawlings.

Reynolds received the honor for originating and developing a new approach to determining the amount of materiel maintained in the Air Force supply system. His work resulted in major changes in Air Force stockage policies, announced in 1957.

The new policy permits less procurement of aircraft spare parts and other supply materiel by providing minimum stock levels, thus enabling stockpiling to be reduced.

Navy Traffic Courses To Run This Month

Navy's first motor vehicle and traffic safety course will be run this month at the Traffic Institute, Northwestern University, in Evanston, Ill. Attending the three-week, 100-hour course will be Naval officers and civilian employees who have traffic safety responsibilities in continental U.S. shore establishments.

Air Force and Army have run similar courses since 1955 and 1946 respectively. According to one Navy spokesman, "Traffic accidents exact a

frightful price from the Navy each year . . . The professional traffic training Naval Personnel will receive at the Traffic Institute will fill a great need in the Navy's over-all accident prevention program.

Among subjects to be included are accident causes, investigation, reconstruction and analysis; use of accident record data; motor vehicle administration; traffic engineering; and the Military Traffic Safety Program.

Shift in Key Personnel

ARMY

Maj. Gen. Edwin J. Messinger, Deputy Chief of Staff, Foreign Military and Civil Affairs, Logistics and Administration, Hq. of the Commander in Chief, Pacific, to Office, Joint Chiefs of Staff in May.

Maj. Gen. John L. Ryan, Jr., Commanding General, The Armor Center, and Commandant, The Armor School, to Hq., Commander in Chief, Pacific, in April.

Maj. Gen. Wilhelm P. Johnson, Commanding General, U.S. Army Training Center (Armor) to Commanding General of the Armor Center and Commandant, The Armor School in April.

Maj. Gen. Ralph J. Butchers, Chief, Army Audit Agency, to Commanding General, U.S. Army Training Center (Armor) in April.

Brig. Gen. Ernest F. Easterbrook, director of Army Aviation, Office of Army Chief of Staff for Operations, to Commandant, Army Aviation School and Commanding General, Army Aviation Center in February.

Brig. Gen. Benjamin S. Kelsey (USAF-ret), former Deputy Director of Research and Development, named chairman of a six-member Ad Hoc Advisory Panel to Dept. of the Army for Aviation Research and Development.

Brig. Gen. Hiram D. Ives, Senior Advisor, Korea Army Training Command to Headquarters, Third U.S. Army in June.

Brig. Gen. Andrew T. McAnsh, Assistant Division Commander, 101st Airborne to Headquarters, Second U.S. Army in March.

Brig. Gen. Charles J. Timmes, Army Council of Review Boards, Office of the Secretary of the Army to 101st Airborne Division in March.

Maj. Gen. Lawrence R. Dewey, Director, Military Assistance Division, U.S. European Command to U.S. Army Audit Agency in March.

Brig. William O. Blandford, Deputy Chief, Army Section (Advisor), Military Assistance Group, Taiwan, to 4th Infantry Div. in June.

Brig. Gen. Theodore J. Conway, Director of Research, Office, Chief of Army Research and Development to Eighth U.S. Army in May.

Brig. Gen. Peter Schmick, Commanding General, 45th Artillery Brigade (Air Defense) to U.S. Army Europe in April.

Brig. Gen. Berton E. Spivy, Jr., Deputy Director for Special Weapons, Office of the Army Deputy Chief of Staff for Operations to Eighth U.S. Army in February.

NAVY

RAdm. Charles H. Lyman III, Chief of Staff at the Naval War College to Commandant, Fourth Naval District in March.

RAdm. Victor D. Long, Commander, Mine Force, Pacific Fleet, to Chief of Staff Naval War College in March.

RAdm. J. P. Monroe, formerly commander, Naval Missile Test Center, Pt. Mugu, retitled Commander, Pacific Missile Range, Pt. Mugu.

RAdm. John McN. Taylor, Assistant Chief of Naval Operations for Naval Reserve, to Commander, Cruiser Force, Atlantic Fleet.

RAdm. Almon E. Loomis, from U.S. Naval Hospital, San Diego, to Commander, Carrier Division 19.

AIR FORCE

Brig. Gen. Lewis L. Mundell, deputy commander, San Antonio Air Materiel Area, to Commander, San Antonio Air Materiel Area.

Maj. Gen. Paul E. Ruestow, Director of Personnel and Support Operations at AMC Hq., to Commander, Middletown Air Materiel Area in February.

Brig. Gen. Donald L. Hardy, Inspector General, Air Materiel Command, to Director of Personnel and Support Operations, Hq. AMC.

Brig. Gen. Charles E. Jung, Deputy Commander, Oklahoma City Air Materiel Area to Commander, Dayton Air Materiel Area.

Brig. Gen. John C. Cawley, Chief of the Manpower and Organization Division, Headquarters, Air Materiel Command, to Inspector General, Air Materiel Command.

Dates to Circle

February 19-20

Armed Services Education Conference—College Park, Md.

March 2-4

American Management Association Fifth Annual Electronics Conference and Exhibit; Statler-Hilton hotel, New York City.

March 5-6

Flight Propulsion Meeting (classified)—Hotel Carter, Cleveland; sponsored by the Institute of the Aeronautical Sciences.

March 5-7

Second Western Space Age Conference and Exhibit—Great Western Exhibit Center, Los Angeles, Cal.; sponsored by LA Chamber of Commerce.

March 8-11

American Society of Mechanical Engineers, engineering meeting on "The Turbine in Action," sponsored by the Gas Turbine Division, Cincinnati, Ohio.

March 9-12

American Society of Mechanical Engineers, Aviation Division Conference—Statler-Hilton Hotel, Los Angeles.

March 12-13

Canadian Aircraft Industry Instrumentation Symposium—Toronto, Canada; sponsored by Toronto Section, Instrument Society of America.

March 19-20

Flight Propulsion Meeting (classified), Institute of Aeronautical Sciences —Hotel Carter, Cleveland.

March 23-25

American Rocket Society, flight-testing Conference—Daytona Beach, Fla.

March 23-26

Institute of Radio Engineers, national convention, New York City.

March 29-April 2

American Society of Mechanical Engineers, Instruments and Regulators Division conference, Cleveland, Ohio.

March 31-April 3

Society of Automotive Engineers, National Aeronautic Meeting, Aeronautic production forum and aircraft engineering display, New York.

Professional Services

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Electrical Engineer, GS-9/11
Electronic Engineer, GS-9/11/12
Electronic Scientist, GS-9/11/12
General Engineer, GS-9/11/12
Mathematical Statistician, GS-11/12
Mathematician, GS-9/11/12/13/14
Mechanical Engineer, GS-9/11
Operation Research Analyst, GS-12/13
Physicist, GS-9/11/12

Civilian Personnel Office
Aberdeen Proving Ground, Md.
Industrial Engineer, GS-14

Quartermaster Research & Engrg. Command, Natick, Mass.
Scientific Director, $16,500

Employment Section
Rm. 1003, Main Navy Bldg.
Washington 25, D.C.
Aeronautical Power Plant Engr., GS-11/12
Electronic Engineer (Radar), GS-12
Electronic Engineer (Fire Control), GS-12
Fire Prevention Engineer, GS-13
General Engineer, GS-12
General Engineer (Pub. Works), GS-12
General Engineer (Missile Fire Control), GS-12
General Engineer, GS-13
General Engineer, GS-13
General Engineer, GS-13
Mechanical Engineer, GS-12
Mechanical Engineer (Missile Fire Control), GS-12
Mechanical Engineer (Missile Launch Systems), GS-11
Mechanical Engineer, GS-9
Naval Architect, GS-9
Structural Engineer (Floating), GS-11
Structural Engineer (Buildings), GS-9
Structural Engineer (Buildings), GS-11
Aeronautical Research Engineer, GS-13
Automotive Engineer, GS-12
Electronic Engineer, GS-11
Electronic Engineer, GS-12
Fire Prevention Engineer, GS-13
General Engineer, GS-13
Mechanical Engineer, GS-11
Mechanical Engineer, GS-12

Industrial Relations Officer
U.S. Naval Ordnance Laboratory
Corona, Calif.
Aerodynamicist, GS-11/12
Aeronautical Research Engineer, GS-11/12
Chemist (Polymer), GS-13
Electronic Engineer, GS-13
Electronic Scientist, GS-13
Physicist, GS-13
Electronic Engineer, GS-12
Electronic Scientist, GS-12

Civilian Personnel Officer
Headquarters, PRNC
U.S. Naval Gun Factory
Washington 25, D.C.
Educational Specialist, GS-11
Mechanical Engineer, GS-11
Occupational Analyst, GS-11

Employment Officer
David Taylor Model Basin
Washington 7, D.C.
Supervising Naval Architect, GS-12

1st Coast Guard District
Boston, Massachusetts
Civil Engineer, GS-9
Electrical Engineer, GS-9

2nd Coast Guard District
St. Louis, Missouri
Electronics Engineer (Radio), GS-9

3rd Coast Guard District
New York, New York
Civil Engineer, GS-11
Civil Engineer, GS-9

5th Coast Guard District
Norfolk, Virginia
Electrical Engineer (General), GS-11
Electronics Engineer (Radio), GS-9

7th Coast Guard District
Miami, Florida
Electrical Engineer, GS-11

8th Coast Guard District
New Orleans, Louisiana
Civil Engineer, GS-9

17th Coast Guard District
Juneau, Alaska
Marine Engineer, GS-11 or GS-9
Electrical Engineer, GS-11

Washington Radio Station
Alexandria, Virginia
Electronics Engineer (Radio), GS-9
Maintenance Engineer, GS-9

U.S. Coast Guard Yard
Curtis Bay, Maryland
Supervisory Electronics Engineer (Gen.), GS-11

U.S. Coast Guard Headquarters
Washington, D.C.
Electronics Engineer (Radio), GS-13
Supervisory General Engineer (Electrical, Mechanical, Acoustics, Optics), GS-13
Supervisory Naval Architect, GS-12
Electronics Engineer (Radio), GS-12
Electrical Engineer (General), GS-12
Aeronautical Engineer, GS-12
Construction Management Engineer (Gen.), GS-12
Physicist (Optics), GS-12
Naval Architect, GS-11
Structural Engineer (Floating Structures), GS-11
General Engineer (Marine Equipment), GS-11
Electrical Engineer (General), GS-11
Mechanical Engineer, GS-11
Mechanical Engineer (General), GS-11
General Engineer (Marine Equipment), GS-9

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IN MY OPINION

(*Continued from page* 4)

the article "AFSWP . . . Its Role in Nuclear Testing" by RAdm. E. N. Parker which appeared in the April 1958 issue of ARMED FORCES MANAGEMENT.

This information is for use in the Naval War College Correspondence Course in Strategy and Tactics.

Capt. D. W. Wulzen
Secretary
Naval War College

Textbooks

The U.S. Army War College (intends) to reproduce the material (Army Logistic Planning for the Future, AFM, March, 1958) in a Discussion Topic Handbook for distribution to students and faculty of the War College for use on its course "The Army in Combat."

Agnes L. Frey
Chief Acquisition Section
U.S. Army War College

Bouquet

"Why Polaris is Winning Its Race Against Time" by Bill Borklund was referred to me. . . . The article appears to me to be a good description of a method which the Navy finds effective in the management of a development project which can be programmed to assure optimum progress. As such the article is interesting and may be very useful in increasing the application of such management techniques to this important and expensive kind of work.

R .W. Larson
Manager-Operation Analysis
Research Operation Dept.
General Electric Co.

Standardization

I observe that the concluding four paragraphs of the article ("The Real Impact of Standardization," September AFM) are a cogent summation of the message on standardization which the military departments must get across to equipment designers and suppliers to the Department of Defense. I particularly subscribe to this sentence which leads off the closing paragraphs:

> "The most significant benefits of standardization do not lie in glamorous reductions, but in the day-to-day application of the workhorses of standardization—standards and specifications."

For the past several years the Navy has been conducting a Stock Coordination Program and related material cognizance surveys through which more than 300,000 items have been dropped from the Navy Supply System. The enclosed article tells of this work in the Navy's Bureau of Supplies and Accounts. I think you will find it interesting and of possible use to your publication.

I am pleased by the interest which ARMED FORCES MANAGEMENT has shown in the subject of standardization.

F. A. Bantz
Assistant Secretary of the Navy (Material)

Liked Promotion Story

As Director of Internal Information for the Tactical Air Command, it is my responsibility to research various national media for items which are of interest to our personnel.

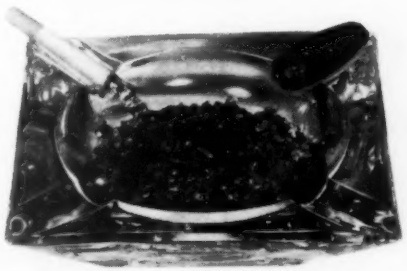
Such an item appears in your December 1958 issue of ARMED FORCES MANAGEMENT, under the heading, "How Officers Get Promoted," by Fred Hamlin. This is an excellent article and its content is of vital importance to TAC officers.

With your permission we would like to reproduce this item for internal use by our key staff officers.

Capt. John W. Keller
Director of Internal Information
Tactical Air Command, USAF

I have read Mr. Fred Hamlin's article on "How Officers Get Promoted" in the December 1958 ARMED FORCES MANAGEMENT.

I like the tenor of the article. The author makes a useful point in recog-



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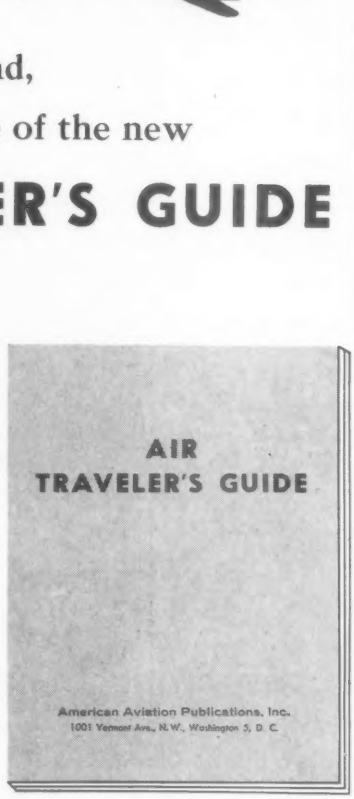

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nizing that promotions are made because of the requirements of the Service and not necessarily as a reward to the individual. The article emphasizes the basic fairness of our Services' promotion policies and concludes that an officer can do something to assist in his own promotion; that is, be a better officer.

I am pleased that this most important aspect of personnel management has received in your magazine the thoughtful discussion that the topic deserves.

Stephen S. Jackson
Deputy Assistant Secretary
Office of the Assistant Secretary of Defense for Manpower, Personnel and Reserve

Thank you for the "How Officers Get Promoted" article. It was both interesting and informative.

As you know, promotion policy is a perennial problem. Your excellent article will help us tell the story of this problem to our officers.

Your article seems to cover the waterfront on officer promotion. I would suggest, in comment only, that there be a complementary story on legal requirements. The Officer Promotion and Officer Grade Limitation Acts now tend to standardize the various Service policies, as well as to influence both the number and the time factors for promotions.

ARMED FORCES MANAGEMENT has always performed the useful function of informing the Services on important matters of professional interest. "How Officers Get Promoted" was in keeping with this function.

Maj. Gen. Thomas C. Musgrave
Director, Manpower Requirements and Utilization Office of the Assistant Secretary of Defense (MP&R)

. . . His presentation of this material (How Officers Get Promoted) is factual and readable and indicates a good appreciation of the subject.

Maj. Gen. Joseph J. Nazzaro
Director of Personnel Planning
U.S. Air Force

I am grateful to you and the ARMED FORCES MANAGEMENT Magazine for Mr. Fred Hamlin's excellent article, "How Officers Get Promoted." Information such as this, which accurately and interestingly portrays the problems in the promotion system of each of the Services, is of material value.

Thank you and your fine publication for a portrayal of the officer promotion system.

Franklin L. Orth
Deputy Ass't Sec'y of the Army
Manpower, Personnel & Reserve Forces

Your Investment Future

What's Ahead In 1959?

by W. Mac Stewart*
Financial Editor

THE year 1958 is history now. And a review of history is important only as it helps understand the present and future. So let's look at 1958 in the light of its effect on 1959.

The first quarter of last year saw the start of recovery from a brief but severe recession started in '57. An almost overnight shift from inventory liquidation to inventory accumulation provided a powerful impetus to recovery, and other economic factors turned upwards as 1958 progressed. The Federal Reserve Board's index of production climbed from a low of 126 in April to a 141 average in the fourth quarter. The Gross National Product climbed 4.4% during the year.

The year was a memorable one. Banks and borrowers will remember the rise in interest rates and decline in bond prices. The recession's depth surprised many business men. But industry reacted quickly—eliminated unessentials, cut overhead, increased efficiency and productivity, and stepped up sales efforts. As a result, industry came out of it stronger than ever.

What happened to the stock market is perhaps more familiar. After some backing and filling during the first quarter, common stock prices staged a nine month advance to a new all-time high at the end of the year. For the entire year, stock prices advanced more than 33%. Bond prices, however, went the other way. Government issues, quality corporate bonds, and high grade municipals all ended the year at or near their lows.

Although common stock prices rose 33%, it would be completely wrong to conclude that profit resulted no matter which stock was purchased during the year. Although the average was up, many stocks failed by a substantial margin to even reach their 1955-1957 bull market highs. And many of these were high grade investment issues considered blue chips by the public.

Naturally, the list of below-average performers was dominated by less known, more speculative issues that too often attract the inexperienced investor who wants to get rich quick. But this does not mean that these issues failed to register gains during the year. If some of these issues were bought at just the right time, substantial profits would have been realized. Thus, selection was extremely important during 1958.

And that leads us into 1959. Barring major foreign upheaval, it appears that an uptrend of security prices will continue. However, as in 1958, very careful selection will be necessary for any investment success. Here's a sketch of how 1959 looks right now:

A good year, but no boom;
Car sales up 20 per cent;
Plant and equipment expenditures up 7%-8%;
Construction up 5%-6%;
Per capita disposable income up 2%-3%;
Gross National Product up 5%;
Industry production up 7%-8%;
Corporate profits up 25%;
A year of labor strife;
Continued discord with Russia and Red China; Nassar seeking to hit the big time;
Foreign trade balance (exports over imports) unchanged to down slightly.

How about security prices? Backed by favorable earnings comparisons with last year, common stock prices will generally be firm. Highs of 1959 will be higher than those in 1958. However, it must be realized that the 1958 rise was based largely on anticipation of improved earnings. Since investors during 1959 may be unwilling to pay higher and higher prices for each dollar earned, they are apt to buy issues which have reached or exceeded those anticipated earnings. The inevitable conclusion is that 1959 will not be a year of continually rising market prices. Rather, there will be several significant interruptions in any price uptrends that develop.

Considering the great selectivity that will be needed to select and supervise securities this year, more and more investors will realize that participation in a broad, well diversified list of common stocks is the only answer to long term investment success. Even a broad portfolio, by itself, does not remove all risk. The portfolio must be watched carefully, new developments analyzed, and industry and economic trends accurately appraised as the year unfolds. Such extensive and continual portfolio supervision can be found only by using full-time professional portfolio management.

The wealthy investor will accomplish this through an investment advisory service. But to most investors, such a service is prohibitive in cost. That is why thousands of investors each day are turning to mutual funds as the only way to enjoy common stock investment benefits, and yet minimize risk by diversification and constant supervision by professional analysts. These services cost the investor only a few pennies or dollars a year. If you are a do-it-yourself investor, 1959 may give you cause to investigate the mutual fund field.

*Vice President—Research
Hamilton Management Corporation

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Run Down of Key Contracts

ARMY

$24 million to **Chrysler Corp.** in two contracts for work on the Jupiter missile program.

$1.0 million to **Skagit Steel & Iron Works** to re-open Sedro-Woolley munitions plant.

$2.2 million to **R. A. Heintz Construction Co.** for embankment protection on the Snake River, Washington.

$5.8 million to **Firestone Tire and Rubber Co.** for work on the Corporal guided missile.

$3.3 million to **R. E. McKee, Inc.** for construction of a laboratory and shop buildings at Ft. Bliss.

$22 million to **Sperry Rand Corp.** for continued development of the Sergeant missile.

$54 million to **The Martin Co.** for continued research and development on the Pershing weapon system.

$6 million to **Hiller Helicopters** for 116 H-23D Raven helicopters.

$13 million to **Western Electric Co.** for research and development on the Nike-Hercules.

$1.1 million to **Brown Engineering Co.** for engineering and machine shop services on the Jupiter missile.

$1.5 million to **Kleinschmidt Div.-Smith-Corona-Marchant, Inc.** for teletypewriters.

$2.8 million to **Norton Division, United Aircraft Milford Dept.** for electronic equipment.

$1.8 million to **Chrysler Corp.** for continued vehicle engineering design services on the medium tank.

$1.2 million to **Sikorsky Aircraft Division of United Aircraft Corp.** for 200 automatic stabilization systems.

$5.0 million to **Raytheon Manufacturing Co.** for engineering services to be provided for the Hawk missile system.

$1.0 million to **Ford Instrument Co.** for engineering services for the Jupiter missile guidance and control components.

NAVY

$1.5 million to **Hoffman Electronics Corp.** for the Sonobouy anti-submarine device.

$23 million to **The Martin Co.** for P5M-2 aircraft.

$21 million to three firms for a dry dock to be built at the Puget Sound Naval Shipyard.

$35 million to **Sikorsky Aircraft Division of United Aircraft Corp.** for S-58 helicopters and spare parts.

$1.4 million to **Sanders Associates, Inc.** for work on classified antisubmarine warfare sonobouys.

AIR FORCE

$136.5 million to **McDonnell Aircraft,** a follow on for production of the F-101 Voodoo.

$8 million to **Lockheed Aircraft Corp.** to continue flights of the recoverable X-7 ramjet test vehicle.

$6 million to **Temco Aircraft Corp.** for maintenance on KC-97 aircraft.

$11 million to **International Business Machines** for expanded memory kits for the SAGE system.

$9 million to **Hoffman Electronics** for radio sets.

$18 million to **Hughes Aircraft Co.** for aircraft weapon control systems.

$3.1 million to **Lear, Inc.** for gyroscopic control assemblies.

$2.8 million to **Sperry Rand Corp.** for radar sets, spare parts, ground support equipment for C-130B, C-133B and KC-135A aircraft.

$2.2 million to **Bendix Aviation Corp., Bendix Radio Division** for radar sets, spares and data.

$15 million to **Boeing Airplane Co.** for B-52 airplanes and support items.

$2.9 and $3.7 million to **Lear, Inc.** for Master Altitude Reference Systems, and flight director indicators, respectively.

$50 million to **Northrop Aircraft, Inc.** for additional Snark intercontinental guided missiles.

$2.3 million to **Avco Manufacturing Corp., Lycoming Division** for continued development of YT53-L-3 engines through test qualification and delivery.

$3.0 million to **Beech Aircraft Corp.** for L-23D Army liaison airplanes.

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